HOUSING ARCHAEOLOGICAL COLLECTIONS

AT THE JOHNS HOPKINS ARCHAEOLOGICAL MUSEUM

By Sara Berg

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JOHNS HOPKINS
KRIEGER SCHOOL
of ARTS & SCIENCES

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INTRODUCTION

For the past several years, visitors to the Johns Hopkins Archaeological Museum (JHAM) would have seen professional staff and student employees engaged in work that typically happens "behind the scenes" in most other museums: the storage and rehousing of the museum's collection. One result of this public display of the work of creating storage containers for over 8000 museum objects has been the opportunity to share our commitment to the professional and ethical stewardship of our collection through appropriate collections care. While every museum has the responsibility of caring for its collection to the highest professional standards, our museum is also driven by its teaching mission, i.e., to provide access to our collection as a resource for the interactive and interdisciplinary study, research, preservation and interpretation of archaeological and historical objects, particularly for the Johns Hopkins University (JHU) community. Our approach, therefore, had to provide both stable housing for our collection, but also make it possible for our collection to be easily utilized by a variety of users. In addition to engaging members of the JHU community, we also take seriously the need to share and disseminate knowledge of the collection to academic researchers and members of the general public through exhibitions, publications and on-line resources. Our collection care strategies therefore had to fulfill all of these goals.

The process of making our collection more physically stable and accessible has led us to develop a series of free resources that strives to share what we have learned with our peer institutions and colleagues. Prior to producing this volume, we published information for a more general audience on our website (http://archaeologicalmuseum.jhu.edu/about-us/2014-institute-of-museums-and-library-sciences-grant-awarded/) and shared our work in an academic journal (see Torres, J., K. Gallagher and S. Balachandran. "Rehousing a 'Working Collection': Perspectives from the Johns Hopkins University Archaeological Museum." Journal of the American Institute for Conservation, Vol 56, Iss. 2 (2017): 96-112). In doing this work, we wanted to provide step-by step instructions for others in similar, small institutions with limited staffing and resources who are striving to attain excellence in collections care and were in search of implementable, low-cost strategies.

The work presented here would not have been possible without the generous support of a Museums for America grant from the Institute of Museum and Library Services, additional funds from JHU alumna Marjorie M. Fisher, and a gift from the Rose Foundation. Through this funding, the JHAM was able to engage the extraordinary talents of Sara Berg, Jennifer Torres, Lisa Anderson and Natasha Jones. They in turn worked closely with numerous student staff who were involved in the rehousing project at the graduate, undergraduate and even high school level. These students included: Dane Clark, Samantha Lindgren, Sarah Kate Lynch, Molly Martell, and Anna-Astrid Oberbrunner. The project is also indebted to the diligent and dedicated work of Katherine Gallagher, Assistant Curator of the museum, photographer Jay T. VanRensselaer whose images appear throughout this volume, and Cathy Schaefer of Splice Design.

One hundred and thirty-six years after the first objects entered the museum collection, 8000 of them are now available for teaching, research, exhibition and enjoyment. We hope this may be a useful resource, and also an inspiration.

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This document grows out of housing practices developed for archaeological objects of various material types within the Johns Hopkins Archaeological Museum (JHAM) collection, a teaching collection. The goal of this guide is to share some of the procedures, tips, and lessons learned during the museum's four-year effort to rehouse its collection. We hope it will be a resource for museum staff, particularly those at small institutions such as our own, who despite limited resources, want to be ethical and professional stewards for their collections. The needs of smaller collections whose staff may not know where to begin with collections housing are considered in each of the feasible, easily implemented, small-scale (and scalable) interventions presented here. This document assumes no prior knowledge in housing objects, and therefore covers fundamental housing principles and provides step-by-step construction instructions for containers and supports. Those new to housing may find it beneficial to read this text from start to finish and those more experienced in housing may be interested in the more complex approaches described.

The organization of this document was inspired by the volume *Storage of Natural History Collections: Ideas and Practical Solutions* and its accompanying website STASHC.com, both of which are invaluable resources for housing instructions and inspiration. The text is divided into three sections — Housing Basics, Containers, and Three-Dimensional Supports. Housing Basics covers the essential tools and materials used at JHAM as well as the procedures used at the museum for gluing boxes and labeling storage containers. Each storage solution presented in the Containers and Three-Dimensional Supports sections has a short description of the final product with possible variations, an explanation of how the system is used at JHAM, and photographs of examples. An alphabetical list of materials, tool, and supplies needed to construct the system and step-by-step construction instructions follows.

The housing procedures described in this document are meant to provide detailed information about some of the available options for improving collections storage with simply implementable storage solutions at minimal cost. While not intended as prescriptive for all collections — ours is customized to the pedagogical mission and particular needs of the JHAM — it is hoped that this document will be of value to those with the privilege and responsibility to care for collections of all kinds.

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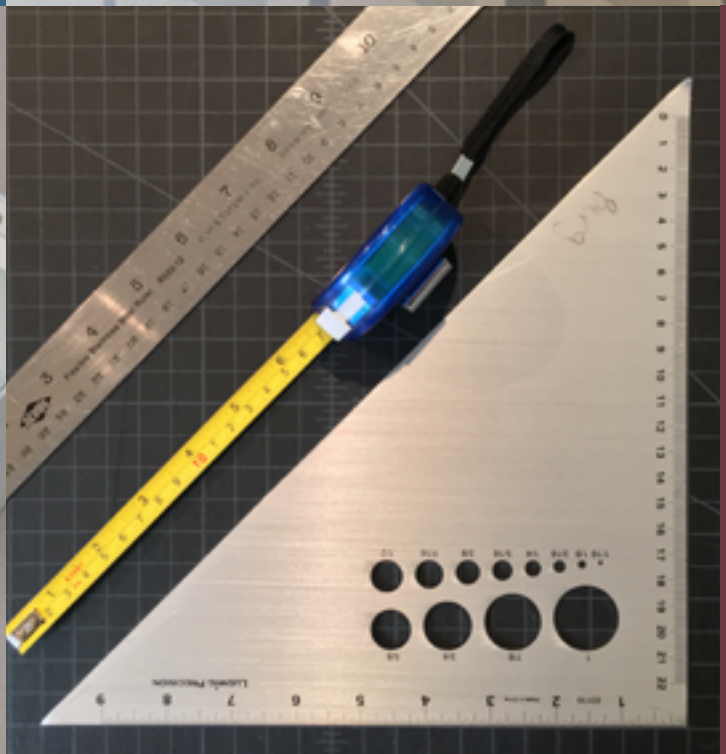
HOUSING ARCHAEOLOGICAL COLLECTIONS


K 20


2814
To remove tray, lift up from
and hold tray at corner



Listed below are the tools most frequently used for constructing storage containers at the Johns Hopkins Archaeological Museum (JHAM).

WRITING INSTRUMENTS

Black felt-tipped marker (Sharpie®) Felt-tipped pen with dye-based ink. Used for labeling polyethylene zip-top bags. While currently the best option available for marking bags directly, over a few years time or if stored in extreme conditions, a yellow halo may develop around the black ink. Available from: art supply store, craft store, or office supply store.

No. 2/HB pencil All-purpose stable writing instrument. Pencils with a No. 2 or HB grade lead have a soft core that leaves dark legible marks. Used for writing labels and plotting measurements on housing materials. Available from: art supply store, craft store, or office supply store.

Sakura Pigma® Micron pen Pen with pigment-based, pH neutral waterproof ink. Compared to dye-based inks, pigment-based inks are more stable and are less susceptible to fading. Available in various sized tips. Available from: Art supply store, craft store, or museum supplier.

CUTTING TOOLS

Foam Knife Specialty knife designed specifically for cutting foam. A foam knife has a thick, rigid blade that will not flex from side-to-side and can be re-sharpened using a kitchen knife sharpener or whet stone. The knife produces straight, smooth cuts, but the thick blade is not always ideal for cutting delicate or curved foam mounts. Available from: museum supplier.

Scalpel Extremely sharp specialty cutting tool used for precision cutting, such as creating cavities in polyethylene foam sheeting (Volara®). Maneuvering a scalpel blade through foam sheeting takes practice and the blades must be replaced frequently to ensure clean cuts. Available from: art supply store, craft store, or museum supplier.

Scissors Used for cutting housing materials such as twill tape, spun-bonded olefin sheeting (Tyvek®), paper, etc. Available from: art supply store, craft store, or office supply store.

Sharps/blade disposal container Purpose-made container for safely disposing blades and sharp objects. Once the container is full, inquire with your institution or local government authority for guidance on appropriate disposal. Available from: scientific and industrial suppliers.

Utility knife and blades All-purpose cutting tool with replaceable blades. Used for cutting housing materials, including polyethylene foam and corrugated blue board. JHAM uses Olfa® brand utility knives because the handles have a locking wheel that prevents the blade from shifting inside the handle. For cutting cavities into polyethylene foam, consider using solid blades, such as Olfa® L-SOL-B blades, instead of snap-off blades which can break suddenly if twisted or bent too far. Available from: art supply store, craft store, hardware store, or museum supplier.

X-ACTO® Knife and Blades Mid-level cutting tool used for all-purpose or precision cutting. Easier to maneuver through polyethylene foam sheeting (Volara®) than a scalpel, Like scalpels, the blades must be replaced frequently to continue to produce clean cuts. Available from: art supply store, craft store, or hardware store.

MEASURING TOOLS

Contour gauge Also known as a profile gauge. Specialty measuring tool used in woodworking to replicate the profile of complex shapes, such as decorative molding. For housing, this tool is gently pressed against a stable object to replicate the surface profile of the object. The gauge is then placed on a piece of foam and the profile is traced onto the foam often with a bamboo skewer. Available from: hardware store.

Flexible curve A flexible ruler commonly used for engineering and sewing to measure and replicate curves. For housing objects, this tool is shaped by hand until the tool matches the surface profile of an object. The tool is then placed on a piece of foam and the shape is traced onto the foam. Flexible curves are stiff and cannot capture the same amount of detail as a contour gauge. Available from: art supply store or craft store.

Measuring tape All-purpose measuring tool. Used for taking longer measurements, such as whole sheets of corrugated blue board. Available from: hardware store.

Ruler, metal with cork backing All-purpose measuring tool. Used for measuring objects and housing materials, plotting measurements, and drawing and cutting straight lines. Metal rulers are preferred because cutting implements (utility knife, X-ACTO® knife, and scalpel) will cut though soft plastic rulers. The cork backing helps prevent the ruler from sliding when cutting. To accommodate different sized projects, it is best to purchase one small ruler (12 inches or 18 inches) and one large ruler (24 inches or 36 inches). Available from: art supply store or from a museum supplier.

Triangle or L-square Mid-level measuring tool that is used to create square corners. A 30-60-90-degree triangle (also known as a 45-degree triangle) can also be used to cut mitered corners. Available from: art supply store, craft store, hardware store, or museum supplier.

OTHER TOOLS

Awl Used for piercing holes in housing materials, such as corrugated blue board and fluted polyethylene board (Coroplast®). Available from: art supply store, craft store, or museum supplier.

Bag weight Flexible, tubular weight filled with steel or lead shot sealed inside a polyethylene tube and covered with unbleached cotton fabric. A versatile weight that can be used to stabilize objects or housing materials during construction. Available from: museum supplier.

Bone folder Used for creasing housing materials, especially corrugated blue board. A standard bone folder typically has a rounded end and a dull pointed end. Specialty bone folders are available and can be used for delicate or specialized tasks such as lifting, scoring, folding, and delaminating. Available from: art supply store, craft store, or museum supplier.

(Left to right) Awl, bone folder, clamps, micro-spatula, pointed wooden skewer, tweezers, and a weight. (Background) Self-healing cutting mat.

Clamps Used to assist with holding housing materials together, especially when gluing. Available from: art supply store, craft store, museum supplier, or hardware store.

Hot-melt glue gun stand Holds a hot-melt glue gun upright when not in use. A hot-melt glue gun should never rest on its side because the glue will continue to melt inside of the chamber and can flood the electrical components of the glue gun, thus damaging the tool. Stands are typically homemade and examples and tutorials can be found on crafting websites and blogs.

Label maker At JHAM, an electronic label maker is used to create storage container labels to ensure visually consistent labels. JHAM uses a Brother P-Touch® label maker (PT-D400), but numerous brands and models are available. Be sure to use a font that formats all letters and numbers uniquely so that there is not confusion when reading accession and inventory numbers. Available from: office supply stores.

Micro-spatula A thin metal tool with two flat, flexible ends. Typically, one end is rounded and the other is pointed. Used for delicate tasks including lifting edges of boxes or objects, threading twill tape through corrugated blue board, etc. Available from: art supply store, craft store, or museum supplier.

Pointed wooden/bamboo skewer The pointed tip on a wooden skewer is used to mark measurements and trace outlines on to polyethylene foam planks and sheeting. It can also be used for wiping away excess hot-melt glue that seeps out from box tabs or underneath foam mounts. Available from: art supply store, craft store, or grocery store.

Self-healing cutting mat Gridded cutting surface for cutting materials and measuring objects or materials. Used to protect work surfaces and help prevent blades from becoming dull. Size depends on one's needs, but a 24 x 18 inch mat is a useful mid-sized mat. (Be aware that the advertised size is often the size of the entire mat, not the dimensions of the work area demarcated by the grid lines. For example, a 24 x 36 inch mat will only have a 23 x 35 inch work area). Available from: art supply store, or craft store.

Tweezers Used for delicate and precise maneuvering of housing materials and for removing excess glue that has seeped out from underneath foam mounts. Available from: art supply store, craft store, or museum supplier.

BOARDS

Fluted polyethylene (Coroplast®) Fluted board that is made from a chemically stable copolymer of polyethylene and polypropylene. Used to make boxes, lids, and pallets for heavy objects or drop-front boxes. Available from: museum supplier.

Corrugated blue board A lignin-free, pH neutral board, called blue board due to its color. Based on the material types within JHAM's collection, corrugated blue board buffered with a 3% calcium carbonate is used. Corrugated blue board is sold in flat sheets and is used to create custom storage containers. Corrugated blue board is available in different flute sizes. The most common flute sizes are B- and E- flute. B-flute board is 1/8 inch thick and E-flute is 1/6 inch thick. Available from: museum supplier.

FOAM

Polyethylene foam A lightweight, chemically stable foam that comes in a variety of sizes, shapes, and densities. Polyethylene foam is used for constructing foam mounts for objects and is easy to cut with a foam knife, utility knife, X-ACTO® knife, or scalpel. The foam also provides shock absorption and is ideal for padding storage or shipping containers. JHAM primarily uses three different types of polyethylene foam: foam planks, foam rods, and foam sheeting.

Ethafoam® A chemically stable closed-cell polyethylene foam manufactured in rigid rectangular-shaped planks and flexible rods. When cutting the rectangular planks for mounts, polyethylene foam sheeting (Volara®, see below) must be adhered to the side of the mount that will be in contact with the object because the cut foam has a rough texture that can damage objects.

Foam rods are extruded into various shapes. In cross-section, the rods can be circular (backer rod), trapezoidal, or triangular (tri-rod). In most cases, the smooth exterior surface of foam rods can be in contact with an object without having to be lined with polyethylene foam sheeting. (Tri-rod has been used extensively to house the Museum's collection and is mentioned in this text; however, tri-rod is no longer manufactured in the United States). Available from: museum supplier.

Volara® Closed-cell, cross-linked polyethylene foam sheeting is available in various thicknesses and colors. This dense flexible foam has a non-abrasive surface that can be in contact with objects and is an excellent material for lining foam mounts, storage containers, storage furniture, and work surfaces. At JHAM, only white and black foam sheeting is used. White foam is preferred for storage applications and black foam is used for display mounts. Available from: museum supplier.

ADHESIVES

3M™ double sided tape #415 Transparent polyester tape coated on both sides with an acrylic adhesive. Used when hot-melt adhesives are not suitable for adhering housing materials together. Available from: museum supplier.

Hot-melt glue gun Glue applicator for all-purpose gluing. Available from: museum supplier or product manufacturer. See also Hot-melt glue gun stand.

Hot-melt glue sticks Adhesive used to hold together storage containers and foam mounts and sheeting. Not all hot-melt glue sticks are appropriate for museum use. Before beginning a major housing project involving a hot-melt adhesive, it is best to consult with other institutions on their most updated recommendations as product formulations do change. Prior to selecting a 3M™ brand hot-melt glue (# 3792 LM Q) for use, JHAM staff consulted with other museums regarding the testing of these adhesives for long-term stability, limited off-gassing of pollutants, and other concerns. Available from: museum supplier or product manufacturer.

OTHER HOUSING MATERIALS

Archival quality acid-free paper White, pH neutral lignin-free paper measuring 8 1/2 x 11 inches. Used for writing labels that are placed inside of housing, such as in polyethylene zip-top bags. Available from: museum supplier. Note: Office supply store paper marked "acid free" is not the same product and should not be used.

Polyester film (Mylar®) Transparent sheeting available in a variety of thicknesses. Used to cover box lid windows which allows objects to be both visible and protected. Be aware that some polyester film has a static charge and should not be used for certain types of objects, such as fragile textiles or basketry. Available from: museum supplier.

Polyethylene zip-top bags Transparent polyethylene bags with a re-sealable zip-top closure. These bags come in various sizes and thicknesses. Thicker bags may have a cloudy appearance making is difficult to see the object inside. JHAM typically uses 4 millimeter (mil) thick bags as they are durable yet flexible and transparent. Zip-top bags are used at JHAM for housing small objects, storing object fragments, or enclosing objects that contain hazardous materials. Available from: museum supplier.

Spun-bonded olefin sheeting (Tyvek®) A lightweight, durable fabric-like material made from polyethylene. Unlike fabrics made from natural fibers, spun-bound olefin sheeting is lint-free, does not attract pests, and is resistant to moisture, mold, and mildew. The sheeting is extremely flexible, allowing it to be wrapped around objects or used to line custom cut polyethylene foam (Ethafoam®) mounts and cavities. Available from: museum supplier or product manufacturer.

Twill tape Woven unbleached cotton ribbon. Twill tape can be threaded through corrugated blue board to create ties for a drop front box or for securing objects inside their storage mounts. When in contact with delicate surfaces, a piece of polyethylene foam sheeting (Volara®) can be threaded onto the twill tape to prevent abrading an object. Available from: museum supplier.

INTRODUCTION

Materials, Tools, & Supplies

- 3M® double sided tape #415
- Corrugated blue board scraps
- Hot-melt glue gun
- Hot-melt glue sticks
- Label maker
- No. 2/HB pencil
- Scissors

Container labels are an essential part of an object's housing. These labels are used for object inventory, identification, retrieval, handling, and keeping relevant collections information associated with a specific object.

There are different types of labels that can be applied to storage containers, the most essential being an accession number label. Other labels include instructional labels and visual aids which are applied to the container to communicate important information to collections users.

Accession Number Labels

At least one accession number label is mandatory for all storage containers. At JHAM, these labels are printed using a label-maker in 24 point Brussels font for maximum legibility and visual consistency.

If an object has an obvious orientation, the placement of the label should correspond with the proper orientation (Figure 1). If an object does not have an obvious orientation, the label is placed on the wall without the box tabs for square boxes or the longest wall for rectangular boxes (Figure 2).

Redundant Accession Number Labels

When possible, multiple accession number labels should be applied to a storage container. These labels assist with inventory and object retrieval, especially for larger or tall objects and storage containers.

FIGURE 1
Accession number label where the placement of the label corresponds with the proper orientation of the object.

FIGURE 2
Accession number label placed on the longest box wall since the object does not have an obvious orientation.

1 2

CONSTRUCTION

Accession Number Labels

1. Identify the accession number in database or other collections documentation.

2. Type the accession number into the label maker as it appears in database or other documentation.

3. Change the font to "Brussels" and the font size to 24 point. If needed, adjust the margin size.

4. Print the label.

5. Check the size of the label before removing the label's backing. If needed, trim the label with scissors.

6. Remove the label's backing and adhere it to the center of the box wall, close to the top edge.

Instructional Labels and Visual Aids

Instructional labels and visual aids assist collection users with an object's safe removal, handling, and replacement. These aids may not be necessary for every object, but are essential for objects that are fragile, complex, have multiple parts in one box (Figure 3), or lack an obvious orientation (Figure 4). Examples include:

• An arrow and a written note indicating a fragile area or part of an object so a user does not lift the object from that part of the object.

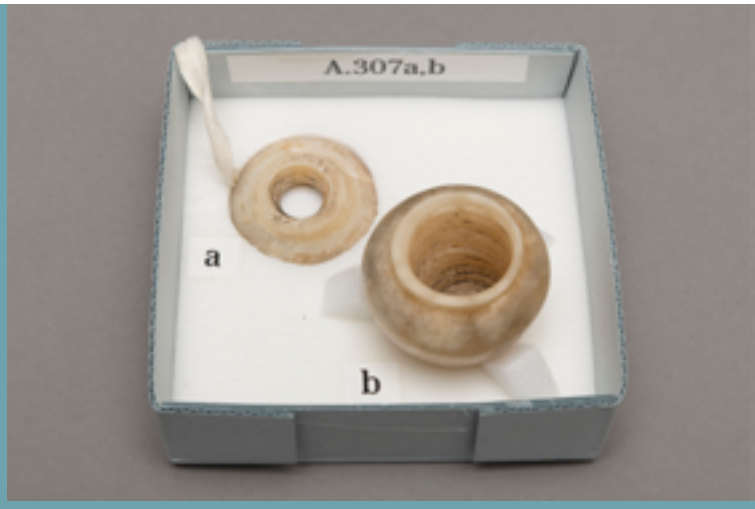
• A written or printed note, a photograph, or hand-drawn illustration showing the correct replacement of an object in its mount.

• An instructional note informing a collections user how to operate or reassemble a storage container.

Overall, instructional labels and visual aids must be clearly visible and legible to collections users but should not be distracting.

FIGURE 3
Instructional labels ("a", "b") indicating the placement of an alabaster vessel and its associated lid.

FIGURE 4
Hand-drawn visual aid in the upper right corner illustrating the correct orientation of the painted decoration on a wall fragment.



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Variation

Redundant Accession Number Labels

1. Follow steps 1 to 3 from Accession Number Labels.

2. Print the labels. For small boxes, print two (2) labels. For large or tall objects and storage containers print four (4) labels.

3. To apply label one, follow steps 5 to 7 from Accession Number Labels.

4. Apply label two to an adjacent interior facing box wall (Figure 5) (Figure 6).

5. Apply labels three and four to the box walls across from the interior labels, but on the exterior side of the box wall.

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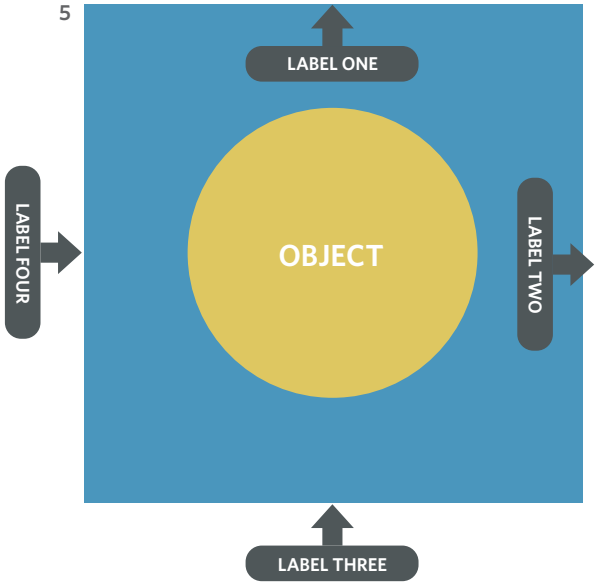


FIGURE 5
Top view of a box indicating the placement of redundant labels.

FIGURE 6
Redundant accession number labeling makes object identification and retrieval easier with larger objects.

6

INTRODUCTION

A box is an object's long-term protective storage container. It therefore must be strong and stable enough to support the object and be neatly constructed. The gluing basics described here provide guidance on the appropriate assembly of the pre-made or custom-made blue board boxes once they have been cut to the appropriate size and configuration. Step-by-step procedures for constructing blue board boxes are given in the following sections of this volume.

A completed box (Figure 1) has straight walls, the box tabs are adhered to the inside of the box, and the tabs are flush with the top edge of the box (Figure 2). Adhering the tabs to the inside of the box allows the sides of boxes to sit flush against each other, maximizing space in storage.

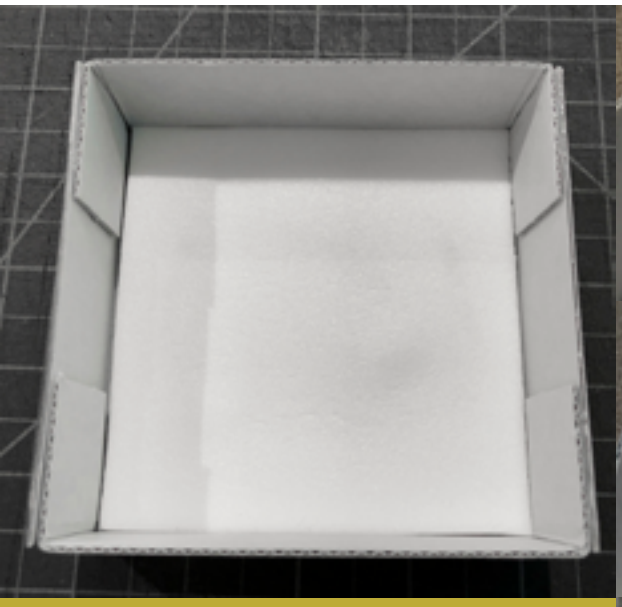
Hot-melt glue cools quickly and will not adhere properly once it has started to cool. As a result, the box tabs should be adhered one at a time, even when constructing small boxes.

Avoid applying too little or too much glue. Applying too little glue will reduce a box's ability to properly support an object, while applying too much glue results in the excess glue seeping out (Figure 3). Firmly press the tab against the box wall to ensure there is no gap between the tab and box wall (Figure 1). This is essential as gaps can worsen over time and become a snagging hazard.

FIGURE 1
Example of a completed box.

FIGURE 2
(Top) Incorrect gluing where the box tabs are not flush with the top edge of the box. (Bottom) Tabs are correctly glued flush with the top edge.

FIGURE 3
Examples of too little glue (left), the correct amount (center), and too much glue (right).



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Materials, Tools, & Supplies

- Hot-melt glue gun
- Hot-melt glue sticks
- No. 2/HB pencil
- Pointed wooden skewer
- Optional: Corrugated blue board scraps, Tweezers, Utility knife

CONSTRUCTION

1. Evenly apply hot-melt glue across the surface of a box tab.

2. Firmly press the tab against the box wall to ensure there is no gap between the tab and box wall.

3. If glue seeps out, use a wooden skewer or a scrap piece of corrugated board to wipe the glue away. Or wait for the glue to cool, and then carefully score the cooled glue with a utility knife before peeling it off manually or with a pair of tweezers.

4. Repeat until all the box tabs have been adhered.

5. When finished, wipe away any thin glue strings, leaving the box free of any extraneous glue.

COMMENTS

Gluing Boxes for Housing Heavy Objects

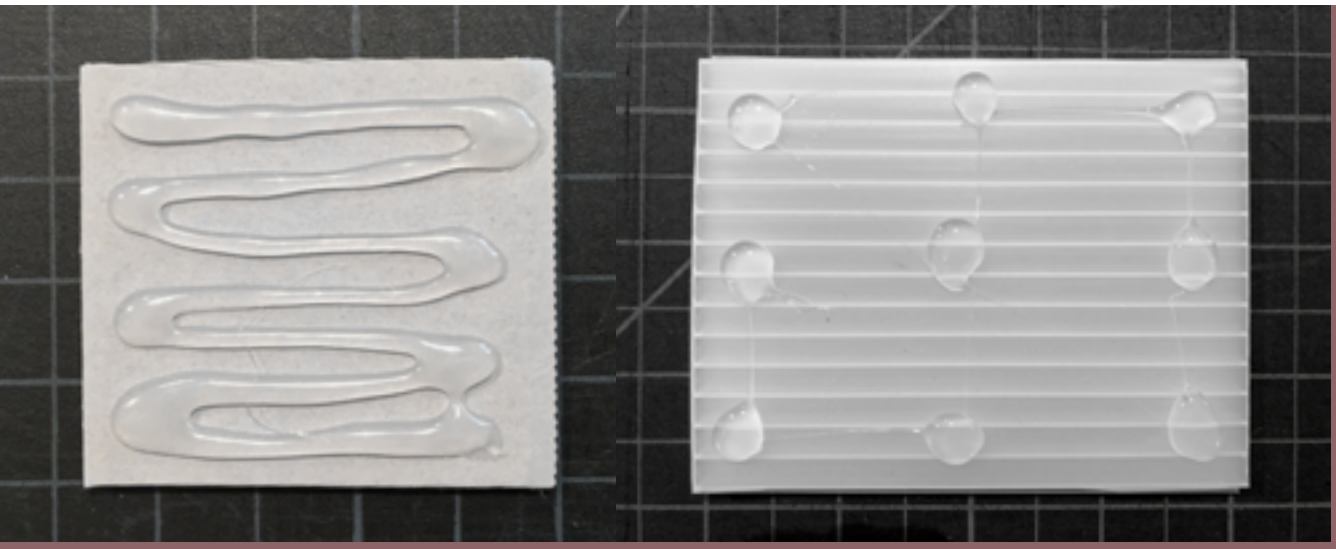
For boxes housing heavy objects, it is acceptable to apply glue more generously to the box tabs as it provides additional structural stability to the corners, which will help the box to hold up over time (Figure 4).

Surface Area

In certain situations, such as adhering large pieces of housing materials together, it may be helpful for the glue to cool more slowly. Applying glue using large dots of glue (Figure 5), makes the glue cool more slowly because the dots have less surface area compared to glue that is applied in straight lines.

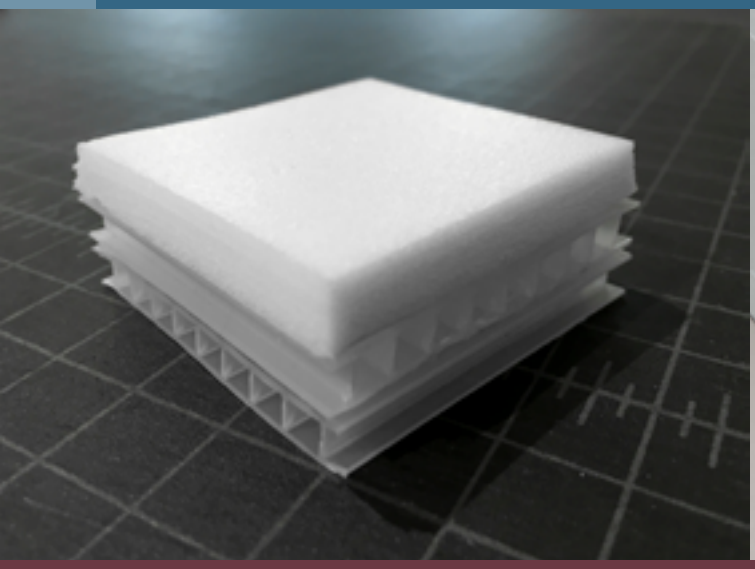
FIGURE 4
An appropriate amount of glue for constructing boxes for housing heavy objects.

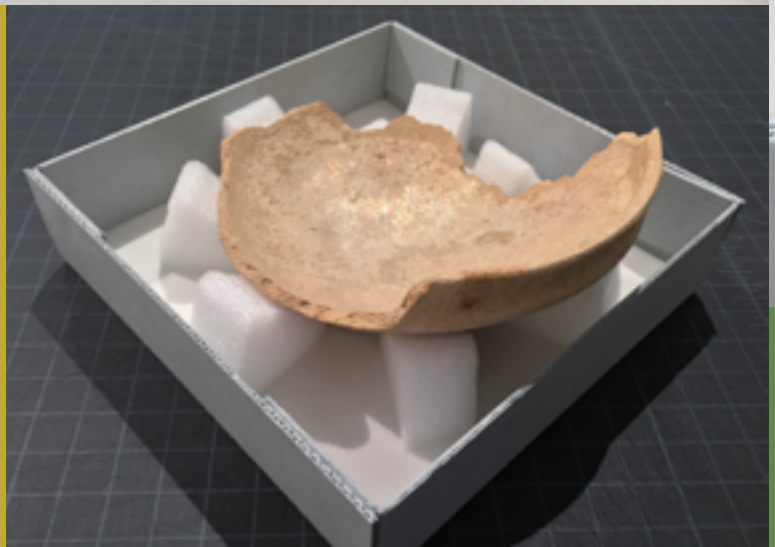
FIGURE 5
Glue dots applied to a piece of fluted polyethylene board to construct a pallet.



4 5

CONTAINERS





INTRODUCTION

JHAM's collection contains many small singular objects which have been housed in polyethylene zip-top bags and subsequently placed inside of a blue board box lined with polyethylene foam sheeting (Volara®) (Figure 1). Using a bag to house small singular objects maximizes visibility and prevents the object from sliding around inside of the box. Bagging small singular objects also minimizes the time and effort needed for rehousing. Examples include small stone fragments, ceramic sherds, and small metal objects.

There are three additional instances where object(s) may be housed in polyethylene zip-top bags:

Multiple Small Robust Objects

It is not prudent to house each piece individually when housing small objects that share an accession number. If the objects are robust enough, they can be housed together in one bag, thus preventing them from becoming disassociated from one another and allowing for safe handling. Examples include stone tesserae or beads (Figure 2).

Object Fragments

Over time, delicate archaeological objects can break, begin to deteriorate, flake, or powder. At JHAM, these fragments are collected and bagged, and then stored with the original object. Examples include fibers from a rope, mortar particles from a mosaic fragment or corrosion products from glass or metal objects.

Hazardous Materials

Museum collections can contain objects made from inherently hazardous materials (for ex., lead objects, pigments made from heavy metals, radioactive substances or live firearms) or hazardous materials may have been applied to or can occur on museum objects (pesticides, mold, guano, etc.). Any objects suspected to be potentially hazardous should be treated based on advice from your local or institutional health and safety officer, conservator or collections manager. For some materials, enclosing an object in a polyethylene zip-top bag is adequate to contain these harmful materials from spreading or becoming inhalation hazards. Always consult with the conservator or collections manager before working with hazardous materials.

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FIGURE 1
Single piece of glass housed in a polyethylene zip-top bag.

FIGURE 2
Multiple small robust beads housed together in a polyethylene zip-top bag.

Materials, Tools, & Supplies

- Acid-free paper, pre-cut ½ inch strips
- Black felt-tipped marker (Sharpie®)
- No. 2/HB pencil
- Polyethylene zip-top bags
- Scissors
- Optional: Acidic paper, Brush

FIGURE 3
Compare the size of object with the size of a bag.

FIGURE 4
Write the accession number on the top half of the bag, between the two dotted lines.

FIGURE 5
Accession number written in pencil on a pre-cut 1/2 inch strip of acid-free paper before the excess paper is cut off.

CONSTRUCTION

1. On a cushioned surface, estimate an appropriate bag size for the object by placing the object on top of a bag (Figure 3).

2. Place the object inside the bag to test if it will safely fit inside. The bag and zip-top closure should not strain over the object or abrade its surfaces. The bag should also not be so oversized that the object is able to slide around inside.

3. Remove the object from the bag and set it safely to the side.

4. With a black felt-tipped marker, legibly write the accession number on the bag between the zip-top closure and the center of the bag (Figure 4). This label is considered to be only a short-term finding aid because marker labels can fade or be worn from bags over time. Therefore, a paper label will be placed inside of the bag (steps 6-8) and is used for longer-term identification.

5. Set the bag aside and let the ink dry. If a labeling error is made, gently erase the ink using a vinyl eraser. Aggressive erasing will cause the plastic to stretch and deform.

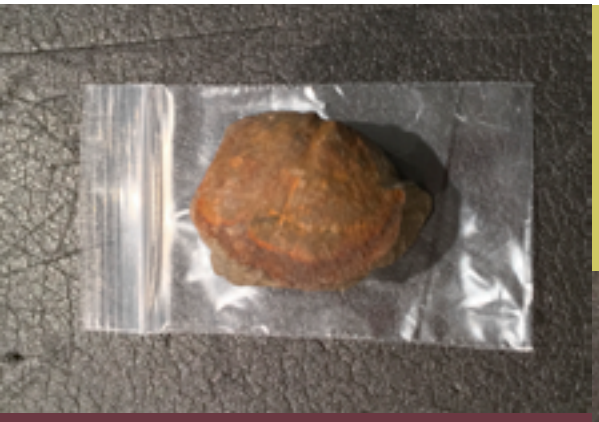
6. Use a pencil to legibly write the accession number on a pre-cut strip of acid-free paper (Figure 5).

7. Cut off the excess paper with a pair of scissors.

8. Place the slip with the accession number written on it inside of the bag.

9. Place the object back into the bag.

10. Neatly place the bag inside of a box lined with polyethylene foam sheeting.



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Variation

Bagging Object Fragments

1. Between the zip-top closure and the center of the bag, legibly write the accession number on the bag (Figure 4).

2. Below the accession number, write "Fragments" and the date on which they were collected.

3. Pour or brush the fragments onto a clean sheet of acidic (or acid-free) paper and gather the fragments in the center of the sheet with a small brush (Figure 6).

4. Fold the sheet in half and pinch one end to create a small funnel-like opening (Figure 7).

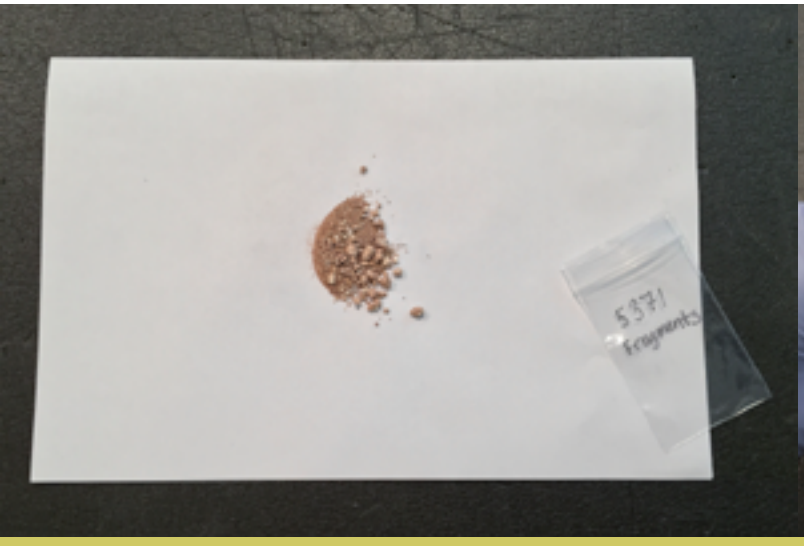
5. Insert the funnel-like opening into the bag (past the zip-top closure) and pour the fragments into the bag (Figure 8).

6. Close the bag and neatly place it inside the box with the associated object.

FIGURE 6
Fragments collected on a clean sheet of paper.

FIGURE 7
Fold paper in half and pinch one end to create a small, funnel-like opening.

FIGURE 8
Insert the funnel-like opening into the bag and pour the fragments into the bag.



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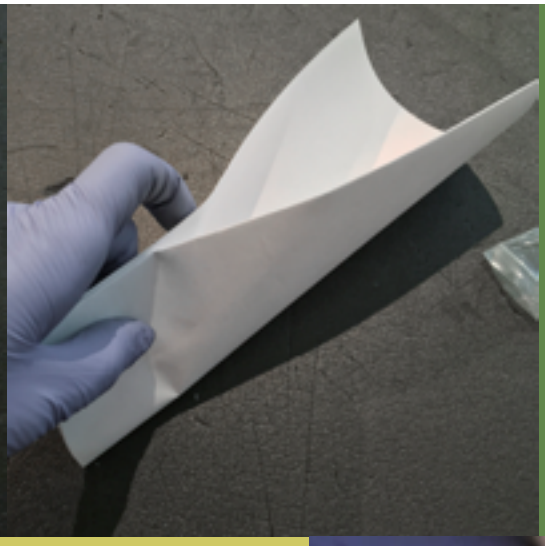

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INTRODUCTION

The JHAM utilizes a series of standard sized pre-made boxes; however, boxes made from corrugated blue board are used when objects will not fit inside standard sized pre-made boxes (Figure 1).

Although the dimensions for a custom box will vary from object to object, the box should always have an adequate amount of space (approximately one inch) between the object and the box wall. The height of the box walls should be low enough for the object to be clearly seen, but tall enough to protect the object and to ensure it cannot tip out. When determining the height for a box, also consider the type of storage furniture (drawer, cabinet, shelf, etc.) where the box will be stored. For example, if a box will be stored on a high shelf and visibility is a priority, lower box walls may be preferred. Alternatively, higher box walls may be required for added safety, particularly if the box will be stored on movable shelving.

The bottom of all the boxes are lined with polyethylene foam sheeting (Volara®). White foam sheeting is preferred for most storage applications as it allows for easy detection of active pest damage or deterioration. In certain situations, particularly when storage containers are used as display mounts, black foam sheeting is used to line boxes (and cover mounts) to create a uniform appearance that will not detract from the object.

FIGURE 1
Custom box with low side for a stone artifact.

Materials, Tools, & Supplies

- Bone folder
- Corrugated blue board
- Hot-melt glue gun
- Hot-melt glue sticks
- No. 2/HB pencil
- Pointed wooden skewer
- Polyethylene foam sheeting (Volara®)
- Ruler, metal with cork backing
- Scissors
- Self-healing cutting mat
- Utility knife

CONSTRUCTION

1. Construct foam mounts to support the object. (See the *Three-Dimensional Supports* section).

Measure Length, Width, and Height

2. Place the object and all of its mounts onto a cushioned surface or a self-healing cutting mat.

3. Use a ruler or the cutting mat gridlines to measure the length and width of the object with all its mounts (Figure 2). Be conscious of parts of the object that over-hang or extend past the mounts (Figure 3).

4. Write the length and width on a piece of paper.

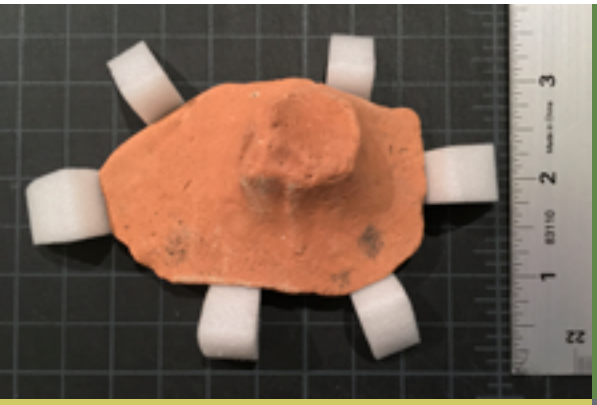

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FIGURE 2
Measure the object with its mounts using the gridlines on a self-healing cutting mat or a ruler.

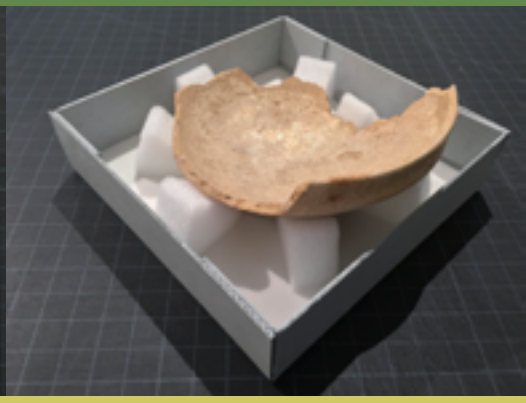

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FIGURE 3
A box that was constructed based on the length and width of the foam mounts and did not consider the rim over-hanging the mounts. As a result, the box wall was too close to the rim.

CONSTRUCTION (CONTINUED)

5. Use a ruler to determine the box height. The box height will vary depending on the size of the object (Table 1) (Figure 4).

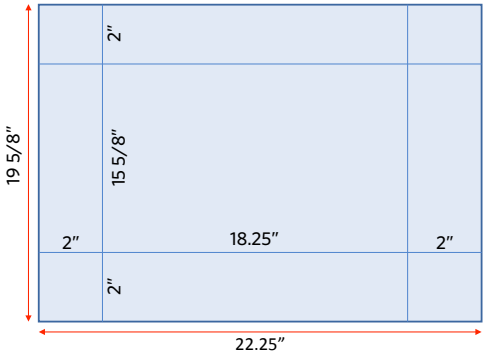
6. Record the measurement on a piece of paper.

Calculate Size of Board Needed to Construct Box

7. To calculate the board dimensions needed to construct the box, double the side height, and add the sum to the length and width. Written mathematically, the equations are:

width + 2(height) = board width
length + 2(height) = board length

For example:
If the dimensions for a box need to be 18 1/4″ wide x 15 5/8″ long x 2″ high, what are the board dimensions needed to construct the box?



width + 2(height) = board width
18 1/4″ + 2(2″) = board width
22 1/4″ = board width

length + 2(height) = board length
15 5/8″ + 2(2″) = board length
19 5/8″ = board length

The board dimensions needed to construct box
= 22 1/4″ wide x 19 5/8″ long

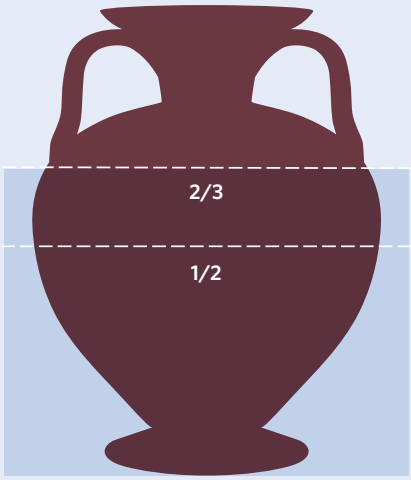


FIGURE 4
Silhouette of an amphora to illustrate the maximum recommended box height for a large object.

TABLE 1 RECOMMENDED BOX HEIGHTS BASED ON OBJECT SIZE

OBJECT SIZE	BOX HEIGHT
SMALL OBJECT	Minimum of 1 - 1 ¼ inches
LARGE OBJECT	No higher than half (1/2) to two-thirds (2/3) the height of the object.

CONSTRUCTION (CONTINUED)

Plot Measurements

8. Select a piece of board to construct the box.

9. Plot the box dimensions onto the board with a ruler and pencil (Figure 5).

10. Before cutting the board, place the object and all the mounts within the plotted lines to ensure the measurements are correct (Figure 5).

11. Remove the object and foam mounts from the board and set them aside.

Cut and Fold Board

12. Place the board onto a self-healing cutting mat and use a utility knife and a ruler to cut the box from the larger piece of board.

13. Use the tip of a utility knife and a ruler to lightly score the top layer of board along the plotted measurements (Figure 6).

14. Use a bone folder to crease the scored board (Figure 7).

15. Cut loose the box tabs that will be used to hold the box together (Figure 6).

16. Fold each of the box walls toward the center of the box and press firmly to create a strong crease (Figure 8). If the box does not have a strong crease, it will have bowed sides.

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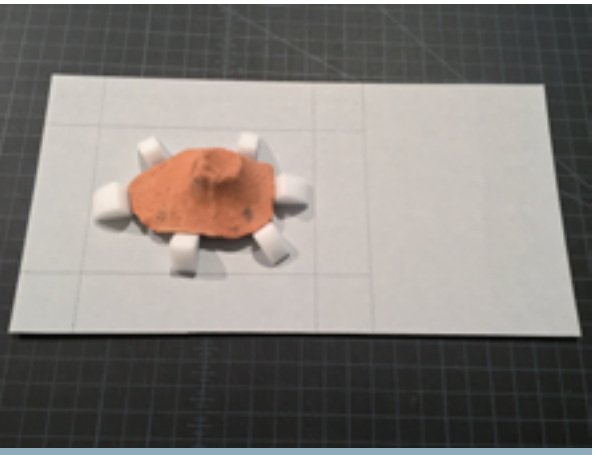

FIGURE 5
Measurements plotted onto the board are checked by placing the object and its mounts onto the board.

FIGURE 6
Score and crease the board along the solid lines and cut along the dotted lines.

FIGURE 7
Use a bone folder to crease the scored board.

FIGURE 8
Fold the box walls towards the center of the box.

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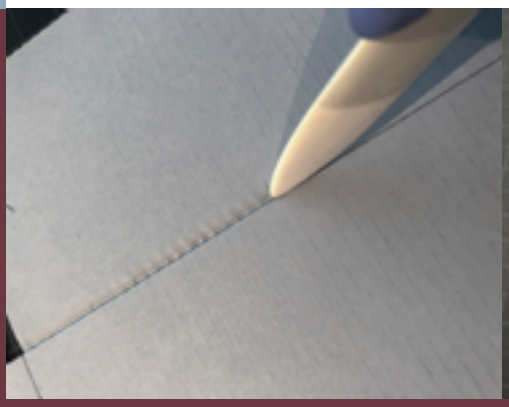

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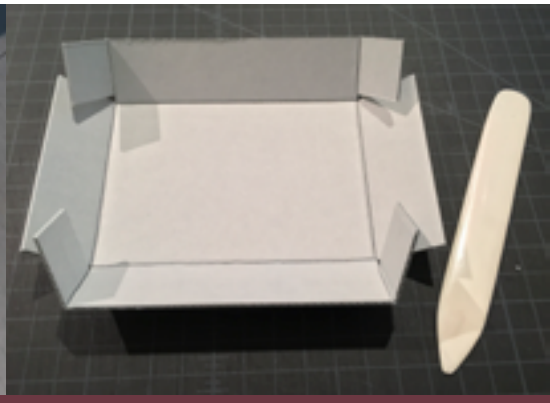


CONSTRUCTION (CONTINUED)

Glue and Line Box

17. Use a hot-melt glue gun to glue the tabs to the interior of the box. (See *Box Gluing Basics* for detailed instructions).

18. With a pointed wooden skewer, outline the base of the box onto a piece of polyethylene foam sheeting (Figure 9). Use 1/8 inch thick foam sheeting for lightweight objects and 1/4 inch thick sheeting for heavier objects.

19. Use a ruler and utility knife to cut the foam.

20. Place the foam inside of the box to ensure it fits properly. For the safety of the object, the edges of the foam sheeting must be flush against the box walls and surface should be smooth. Trim the foam if needed.

21. Apply hot-melt glue to the bottom of the box.

22. Quickly place the foam lining into the box. Firmly press down on the foam to fully adhere it to the bottom of the box, checking that all foam corners are securely attached to the box floor.

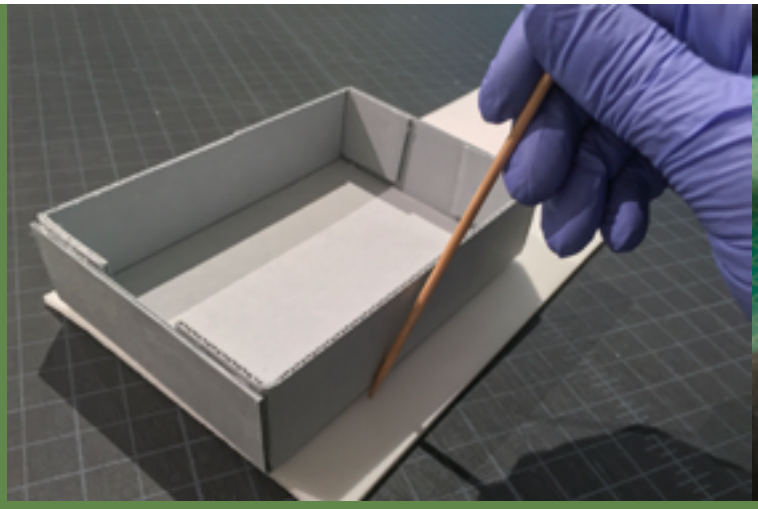
COMMENTS

Constructing Box Before or After Constructing Foam Mounts

Some housing specialists prefer constructing a box before constructing the foam mounts for an object. However, a disadvantage of this approach is that the box may be too small to accommodate the object and the foam mounts. An alternative approach is to construct the foam mounts and then adhere them to a pallet made from corrugated blue board (Figure 10). The box is then constructed to accommodate the dimensions of the pallet.

FIGURE 9
Outline the base of the box onto a piece of foam sheeting.

FIGURE 10
Corrugated blue board pallet with foam mounts being placed inside of a custom-made box.



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INTRODUCTION

A drop-front box (Figure 1) is a versatile container with three immobile walls and a fourth wall that can be lowered as needed to allow an object to be seen or slid out on an internal tray, as necessary (See Pallet for Heavy Objects or Drop-Front Box). This type of box is particularly useful for larger objects that need to remain upright for stability, but require the additional protection of higher walls. Like other custom boxes, the height of a drop-front box varies from object to object (Figure 2). If needed, a lid can also be constructed for this type of box (See *Custom Corrugated Blue Board Lid*).

FIGURE 1
Drop-front box protecting a cartonnage fragment. A lid (not photographed) is used to cover the box opening and provides further protection.

FIGURE 2
Drop-front box with low sides and the object is clearly visible. provides further protection.

1

2

Materials, Tools, & Supplies

- Awl
- Bone folder
- Corrugated blue board
- Hot-melt glue gun
- Hot-melt glue sticks
- No. 2/HB pencil
- Ruler, metal with cork backing
- Scissors
- Self-healing cutting mat
- Twill tape
- Utility knife
- Optional: Clamps, Measuring tape

CONSTRUCTION

1. Construct the foam mounts and a pallet to support the object. (See the Three-Dimensional Supports section and *Pallet for a Drop-Front Box or a Heavy Object*).

Determine Dimensions for Box

2. Measure the length and width of the pallet with a ruler or a measuring tape. Write the measurements on a piece of paper.

3. With the object and its foam mounts sitting on the pallet, measure the box height. Write the measurement on a piece of paper.

Calculate Size of Board Needed to Construct Box

4. Calculate the board dimensions needed to construct the box. To do so, double the box height and add the sum to the length and width. Written mathematically, the equations are:

width + 2(height) = board width
length + 2(height) = board length

Plot Measurements

5. Select a piece of board to construct the box.

6. Plot the box dimensions onto the board with a ruler and pencil.

7. Before cutting the board, place the pallet within the plotted lines to ensure the measurements are correct. All the plotted measurements should still be visible.

8. Remove the pallet from the board and set it aside.

Cut and Fold Board

9. Place the board onto a self-healing cutting mat and use a utility knife and a ruler to cut the box from the larger piece of board.

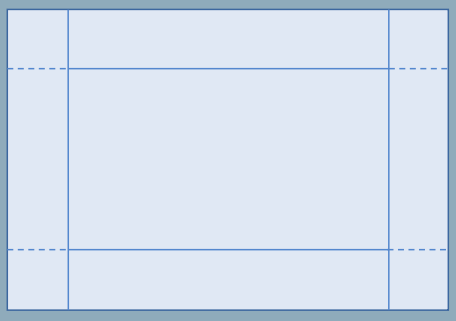
10. Use the tip of a utility knife and a ruler to lightly score the top layer of board along the plotted measurements (Figure 3).

11. Use a bone folder to crease the scored board (Figure 4).

12. Cut loose the box tabs that will be used to hold the box together (Figure 3).

13. Fold each of the box walls toward the center of the box and press firmly to create a strong crease (Figure 5). If the box does not have a strong crease, it will have bowed sides.

FIGURE 3
Score and crease the board along the solid lines and cut along the dotted lines.



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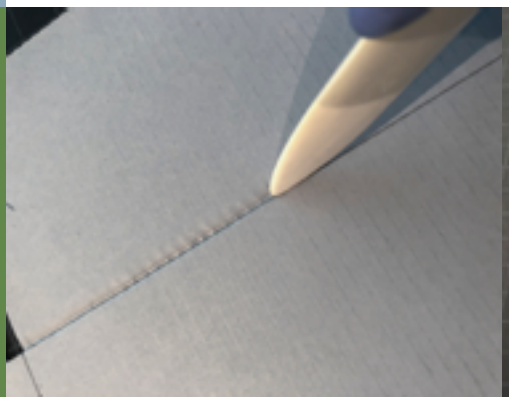

FIGURE 4
Use a bone folder to crease the scored board.

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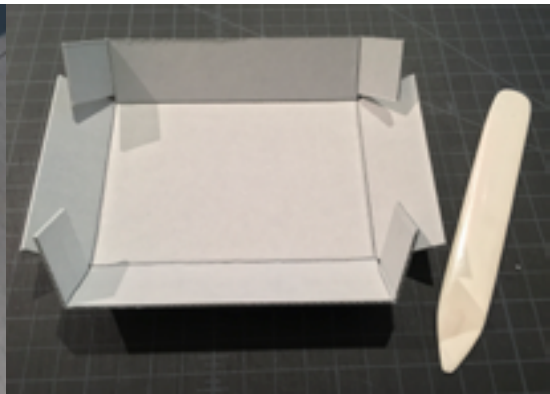


FIGURE 5
Fold the walls towards the center of the box.

CONSTRUCTION (CONTINUED)

Glue Box

14. Glue only two of the box tabs to the inside of the box.

Pierce Holes for Drop-Front

15. Turn the two remaining box tabs that will form the drop-front part of the box to the inside of the box and use a pair of clamps to hold them in place.

16. On both sides, use an awl to pierce two sets of holes through the box wall and box tab (Figure 6). The holes should be placed near the top edge of the box and should be fairly small and close together (about 1/4 to 1 inch apart) (Figure 7). If the holes are too large, the twill tape can shift and cause the box tabs to move around.

17. For boxes with narrow tabs, the holes can be oriented vertically and pass through the center of the box tab (Figure 8).

Tying Drop-Front

18. Cut two long pieces of twill tape using a pair of scissors.

19. Thread one piece of twill tape through each set of holes and tie the twill tape into a bow (Figure 9). The finished bows should be easy to re-tie, but not so long that they are a snagging hazard.

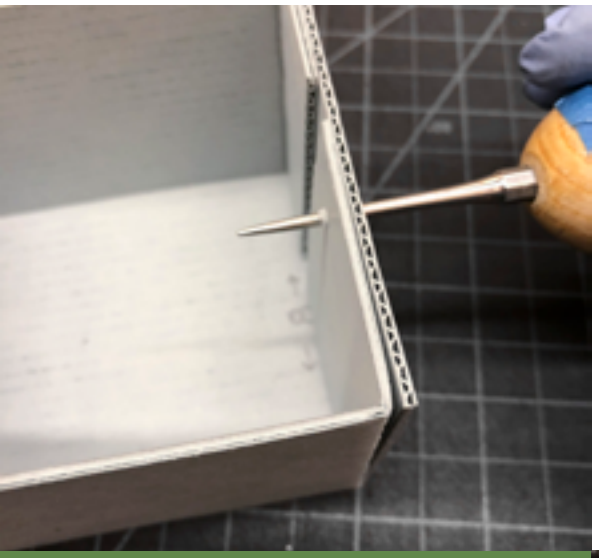
20. Use a pair of scissors to cut off any excess twill tape if the ends of the bow are too long.

21. Tie a small tight knot on the ends of the twill tape to prevent them from fraying (Figure 10).

FIGURE 6
Pierce two sets of holes through the box walls and box tabs.

FIGURE 7
Right side of a box with the holes small, close together, and near the top edge of the box.

FIGURE 8
Box with narrow tabs. The holes are oriented vertically and are centered on the box tab.



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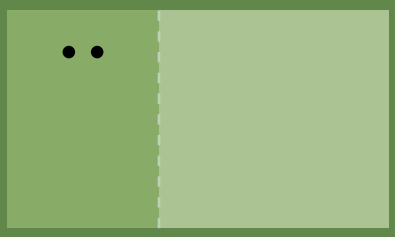

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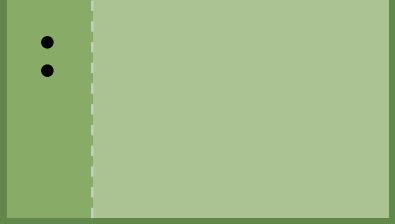

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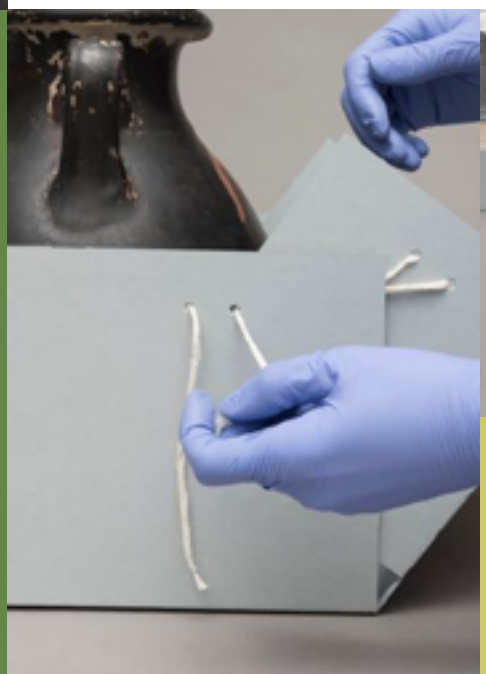

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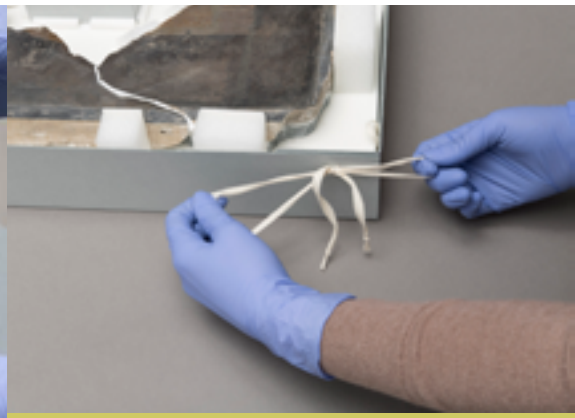

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FIGURE 9
Thread a piece of twill tape through each set of holes.

FIGURE 10
Finished bow. The ends of twill tape have been knotted to prevent fraying.

INTRODUCTION

A pallet is a flat supportive tray used to support objects. At JHAM a pallet has two different applications. The first application is as a supportive tray for heavy objects that is typically adhered to the bottom of a box, and therefore is not movable (Figure 1). The second application is as a movable internal tray with twill tape pulls which can be easily removed from a drop-front box (See Figure 2 in *Custom Corrugated Blue Board Drop-Front Box*). The twill tape pulls were adapted from Carl Schlichting's "Working with Polyethylene Foam and Fluted Plastic Sheeting".

For lightweight objects, a pallet can be made from one or multiple pieces of single- or double-walled blue board. The weight of some objects may require the use of a fluted polyethylene board (Coroplast®) for additional structural stability. (The following instructions specifically cover pallets made from polyethylene board, however, they are also applicable for constructing blue board pallets.) When constructing a pallet from multiple pieces of board, the pieces are cut so that the flutes are oriented perpendicular to one another (Figure 2); this makes the pallet strong and rigid, thus limiting any flexing of the tray. Lastly a piece of polyethylene foam sheeting (Volara®) is used to cover the surface of the pallet.

FIGURE 1
Pallet used to reinforce the bottom of a corrugated blue board box to support a heavy canopic jar lid.

FIGURE 2
Pallet made from fluted polyethylene board illustrating the perpendicular orientation of the fluting.

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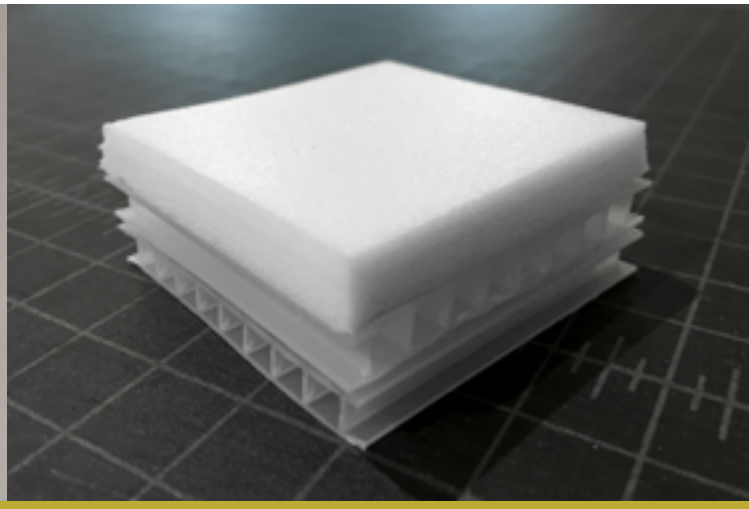

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Materials, Tools, & Supplies

- Bone folder
- Fluted polyethylene board (Coroplast®)
- Hot-melt glue gun
- Hot-melt glue sticks
- No. 2/HB pencil
- Pointed wooden skewer
- Polyethylene foam sheeting (Volara®)
- Ruler, metal with cork backing
- Scissors
- Self-healing cutting mat
- Twill tape
- Utility knife
- Weights
- Optional: Clamps

CONSTRUCTION

1. Construct foam mounts to support the object and a pallet for a drop-front box. (See the section on *Three-Dimensional Supports* for instructions).

Determine Size of Pallet

2. To determine the dimensions for the *top* piece of board, measure the length and width of the object with all of its mounts. Include enough space to accommodate any part of the object that over-hangs the foam mounts.

3. Write the measurements down on a piece of paper.

4. For the *bottom* piece of board, the length and width need to be roughly 1/4 inch less than the top piece (Figure 3). The bottom board must be slightly smaller because the top side of the top piece of board must always be the widest part of the pallet or the completed pallet will not properly fit into its box (Figure 4).

5. Write the measurements for the bottom piece of board on a piece of paper.

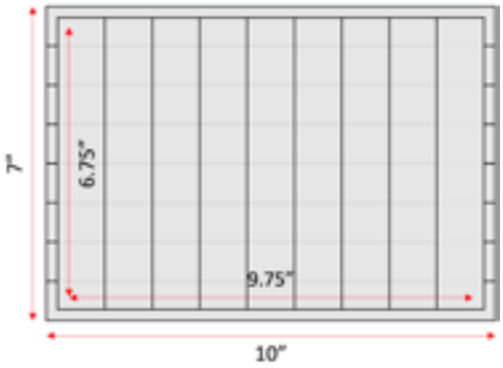

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FIGURE 3
Example of top and bottom board measurements. If the top board measures 10" wide by 7" long, then the bottom board would be roughly 9.75" wide by 6.75" long.

FIGURE 4
The top side of the top piece of board must be the widest part of the pallet. To ensure this, the bottom board is smaller than the top board; the bottom halves of the far left and right flutes on the top board have be removed (step 13); and the foam sheeting is slightly beveled (step 22).

CONSTRUCTION (CONTINUED)

Plot Measurements

6. Select one or multiple pieces of board to construct the pallet.

7. Plot the measurements onto the board using a pencil and ruler. Never plot measurements on top of the seams that form the flutes (Figure 5); cutting through a seam is incredibly difficult. To move the measurement away from a seam, add or subtract roughly 1/8 inch from the board measurement.

8. Before cutting the board, place the object and mounts within the plotted lines to ensure the measurements are correct.

9. Remove the object and mounts from the board and safely set them to the side.

Score, Cut, and Trim Board

10. Never rush when cutting polyethylene board. Always use a sharp utility knife. Work in small sections at a time and apply a pressure on the ruler so that it does not slip.

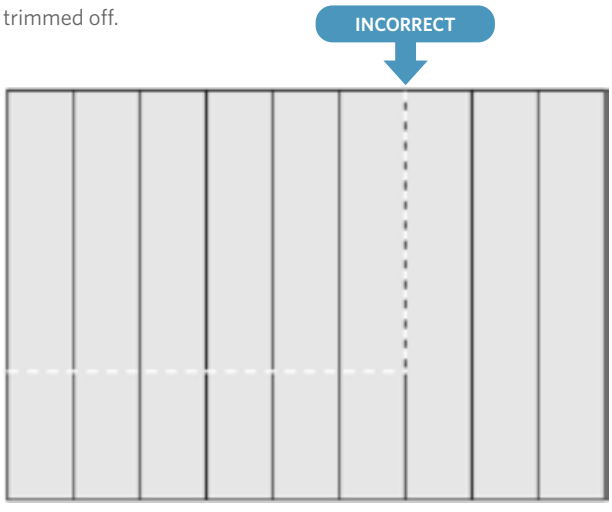
11. Place the board onto a self-healing cutting mat and use a sharp utility knife and a ruler to first score the board along the plotted measurements, even when cutting parallel to the flutes.

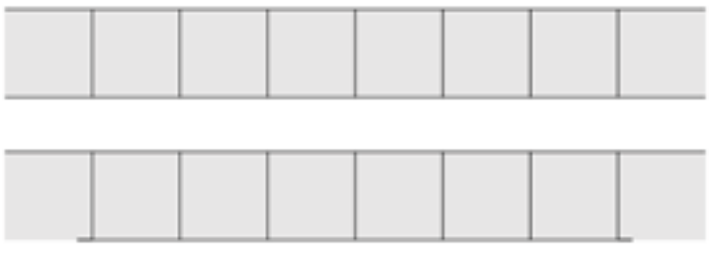
12. Increase the pressure on the knife to start cutting the board. Do not expect to cut through the board on the first pass, it may take two or three passes to fully cut through the board.

13. For the top board only, trim off the bottom halves of the far left and right flutes to ensure the top side of the board will be the widest part of the pallet (Figure 4 and Figure 6).

FIGURE 5
Do not plot measurements on top of the seams that form the flutes.

FIGURE 6
(Top) Top piece of board before bottom halves of the left and right flutes have been trimmed off. (Bottom) The same piece of board after the bottom halves of the left and right flutes have been trimmed off.





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CONSTRUCTION (CONTINUED)

Glue Pallet

14. Apply large dots of glue around the perimeter and in the center of the top piece of board (Figure 7).

15. Quickly place the bottom piece of board on top. Apply a significant amount of pressure to ensure that the glue spreads out as much as possible before it cools. Weights or clamps can also be used to help apply pressure.

Line Pallet

16. Use a utility knife or scissors to cut a piece of polyethylene foam sheeting slightly larger than the pallet.

17. Place the foam sheeting on top of the pallet so it covers the entire surface of the pallet.

18. Place a weight on top of the foam to hold it in place (Figure 8).

19. Lift one edge of the foam and apply glue to a small section of the pallet (Figure 8).

20. Use the wide flat side of a bone folder to firmly press the foam against the pallet (Figure 9). Place the weight on top of the adhered section of foam to maintain some pressure on the glued section.

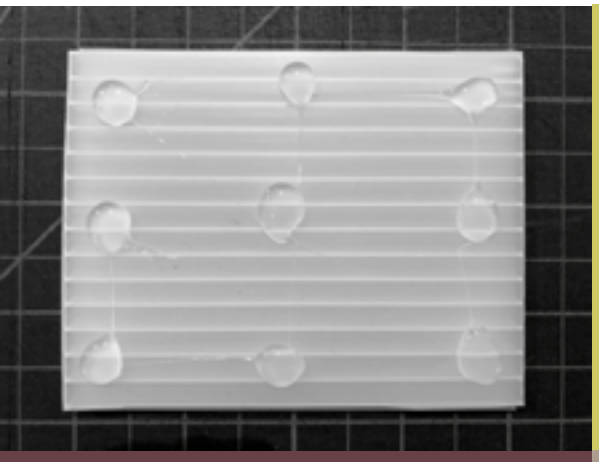
21. Continue working in small sections until the foam is fully adhered to the board.

22. Trim off any excess foam with a utility knife by slightly slanting the blade towards the center of the pallet to create a slight bevel; this ensures the foam is not wider than the pallet (Figure 4).

FIGURE 7
Apply large dots of glue around the perimeter and within the center of the top piece of board.

FIGURE 8
Place weight on top of foam. Lift one end and apply glue to a section of the board.

FIGURE 9
Use the wide flat end of a bone folder to adhere the foam sheeting to the pallet.



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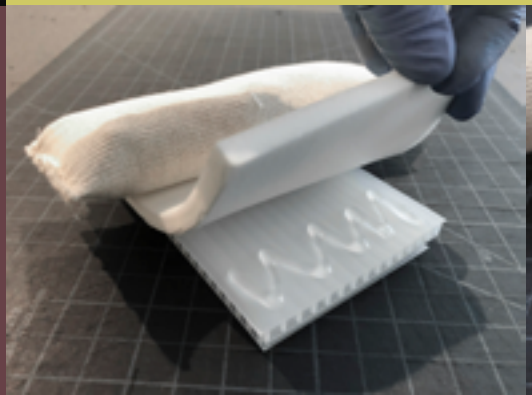

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CONSTRUCTION (CONTINUED)

For Heavy Objects - Glue Pallet into Box

23. Apply large dots of glue around the perimeter and in the center of the box. Quickly place the pallet inside of the box and apply pressure onto the pallet to fully adhere to the box.

24. Adhere any necessary foam mounts onto the pallet.

For Drop-Front Boxes - Twill Tape Pull

25. With a pair of scissors, cut a piece of twill tape about 5 to 7 inches long. Fold the twill tape in half and tie the two ends together to form a loop

26. Slide the knotted end into the central flute of the pallet. With a utility knife, cut a small slit above and below the knot (Figure 10).

27. Press the tip of the glue gun into each slit and inject glue into the flute, thus securing the twill tape in place (Figure 11). Let the glue cool.

28. Turn the pallet over and glue any necessary foam mounts onto the pallet.

FIGURE 10
Knotted piece of twill tape placed inside the central flute. The black lines above and below the knot indicate size and placement of the slits.

FIGURE 11
Press the tip of the glue gun into each of the slits.

10

11

INTRODUCTION

Although JHAM prefers housing its collection in a highly-visible manner so objects can be easily browsed in storage, there are some situations where lidded boxes are required. Custom lids are typically made from single-walled corrugated blue board and are used to cover and protect objects in the following situations.

Human Remains

JHAM is responsible for the care of human remains in its collection and, out of respect for these individuals, all boxes containing their remains are covered with lids. Lids also ensure that their remains are only visible and accessible when appropriate.

Protection Against Deterioration

Some objects in the collection are more vulnerable to deterioration than others and covering them with lids is a simple way to protect them from dust, excessive light exposure, or moisture (Figure 1). For light sensitive objects, a photograph of the object can be adhered to box to assist with identification. For objects that are less susceptible to light damage, a window can be cut into the lid and covered with a sheet of polyester film (Mylar®) so the object remains visible (Figure 2).

Hazardous Materials

Museum collections can contain objects made from inherently hazardous materials (for ex., lead objects, pigments made from heavy metals, radioactive substances or live firearms) or hazardous materials may have been applied to or can occur on museum objects (pesticides, mold, guano, etc.). Any objects suspected to be potentially hazardous should be treated based on advice from your local or institutional health and safety officer, conservator or collections manager. For some materials, enclosing an object in a polyethylene zip-top bag is adequate to contain these harmful materials from spreading or becoming inhalation hazards. Always consult with the conservator or collections manager before working with hazardous materials.

Transport

Lids are also used to protect objects when they are being transported to off-site storage or while on loan.

FIGURE 1
A lid without a window to protect a cat mummy.

FIGURE 2
Lids with windows. These windows are covered by a sheet of polyester film to prevent pollutants from coming into contact with the waxy surface of the two casts.

1

2

Materials, Tools, & Supplies

- 3M™ double sided tape #415
- Bone folder
- Corrugated blue board
- Hot-melt glue gun
- Hot-melt glue sticks
- Measuring tape
- Polyester film (Mylar®)
- No. 2/HB pencil
- Ruler, metal with cork backing
- Scissors
- Self-healing cutting mat
- Utility knife

CONSTRUCTION

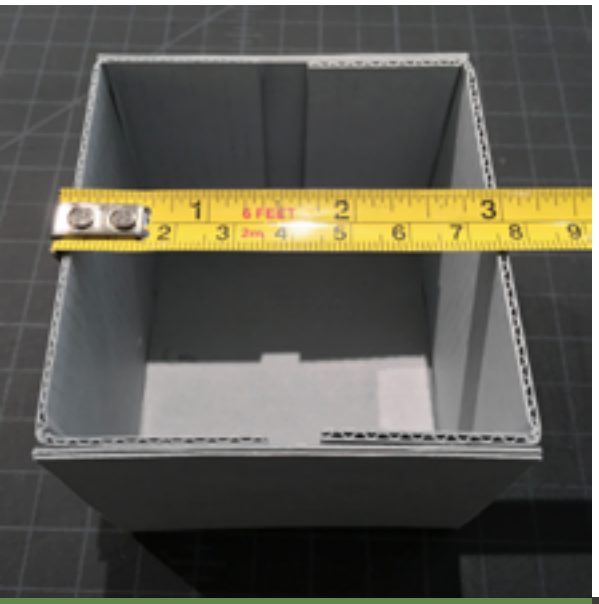
Determine Length and Width for Lid

1. Use a measuring tape to measure the length and width of the box opening in multiple places (Figure 3) because the opening might not be a perfect rectangle or square (e.g., one side can be slightly wider than the other) or the sides can be bowed outwards.

2. Write the final measurements down on a piece of paper.

3. Additional space is needed to accommodate the lid tabs used to hold the lid together because the tabs will be turned to the inside of the lid (Figure 4). The amount of additional space needed depends on the thickness of the board that will be used to construct the lid (Figure 5).

4. To calculate the additional space needed, double the board thickness, and add the sum to either the width or the length (but not both).



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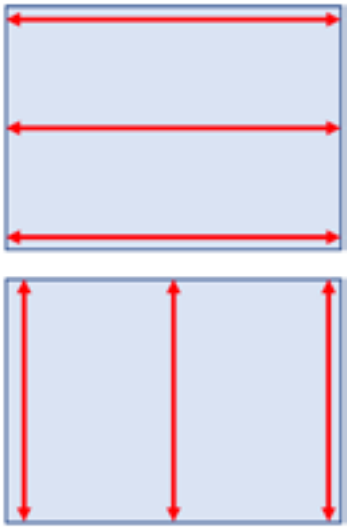

FIGURE 3
(Left) Measure the opening of a box. (Right) Measuring in three different places is sufficient to determine the length and width of the box opening.

FIGURE 4
Bottom view of a box that has a 3" by 3" opening. The lid is made from 1/16 inch board, so the top of the lid is 3" long by 3 1/8" wide to accommodate the tabs.

FIGURE 5
The different types of board used at JHAM and their thicknesses.

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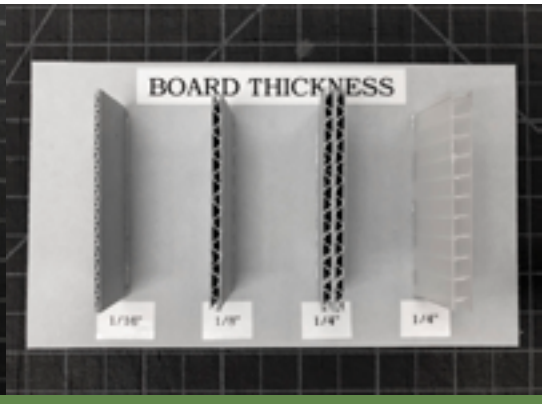

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CONSTRUCTION (CONTINUED)

Determine Lid Height

5. Determine how tall the sides of the lid should be. This measurement will vary depending on the size and height of the box (Table 1); however, lids taller than 3 inches can be difficult to remove.

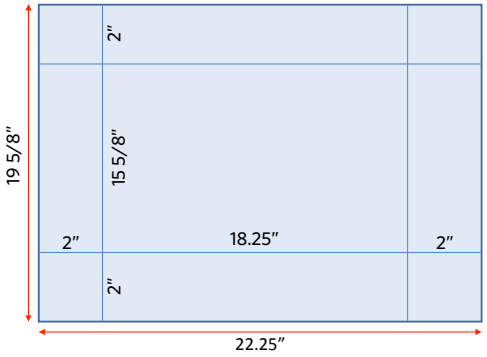
6. Short boxes can have lids that are the same height as the box. Half circles need to be cut into the sides to allow easy removal (Figure 6).

Calculate Size of Board Needed to Construct Lid

7. To calculate the board dimensions needed to construct the lid, double the lid height, and add the sum to the length and width. Written mathematically, the equations are:

width + 2(height) = board width
length + 2(height) = board length

For example: If the dimensions for a lid need to be 18 1/4″ wide x 15 5/8″ long x 2″ high, what are the board dimensions needed to construct the lid?



width + 2(height) = board width
18 1/4″ + 2(2″) = board width
22 1/4″ = board width

length + 2(height) = board length
15 5/8″ + 2(2″) = board length
19 5/8″ = board length

The board dimensions needed to construct lid
= 22 1/4″ wide x 19 5/8″ long

FIGURE 6
A lid that is the same height as the box has half circles cut into the lid to assist with removal.

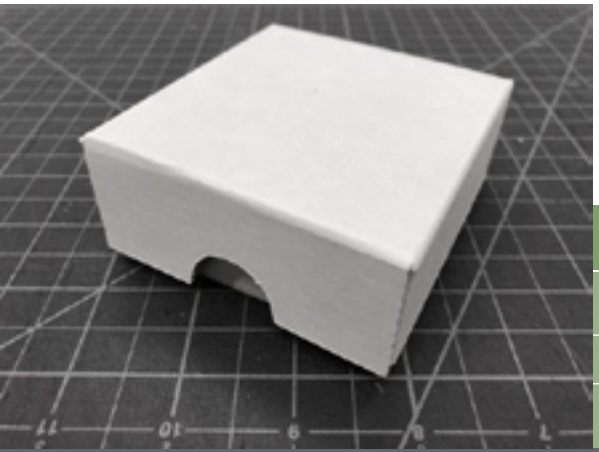


TABLE 1 RECOMMENDED LID HEIGHTS

BOX SIZE	LID HEIGHT
SMALL, SHORT	1 - 1 ¼ inches or equal to the height of the box
MEDIUM, LARGE, TALL	1 ¼ inch – 3 inches maximum

CONSTRUCTION (CONTINUED)

Plot Measurements

8. Select a piece of board to construct the lid and plot the lid dimensions onto the board using a ruler and pencil.

9. Before cutting the board, turn the empty box upside down and place it on top of the lid to ensure that the measurements are correct (Figure 7). All the plotted measurements should still be visible.

10. Remove the box from the board and set it aside.

Cut and Fold Board

11. Place the board onto a self-healing cutting mat and use a utility knife and a ruler to cut the lid from the larger piece of board.

12. Use the tip of a utility knife and a ruler to lightly score the top layer of board along the plotted measurements (Figure 8).

13. Use a bone folder to crease the scored board (Figure 9).

14. Cut loose the tabs that will be used to hold the lid together (Figure 8).

15. Fold each of the sides toward the center of the lid and press firmly to create a strong crease (Figure 10).

Glue Lid

16. Use a hot-melt glue gun to glue the flaps one at a time to the inside of the lid.

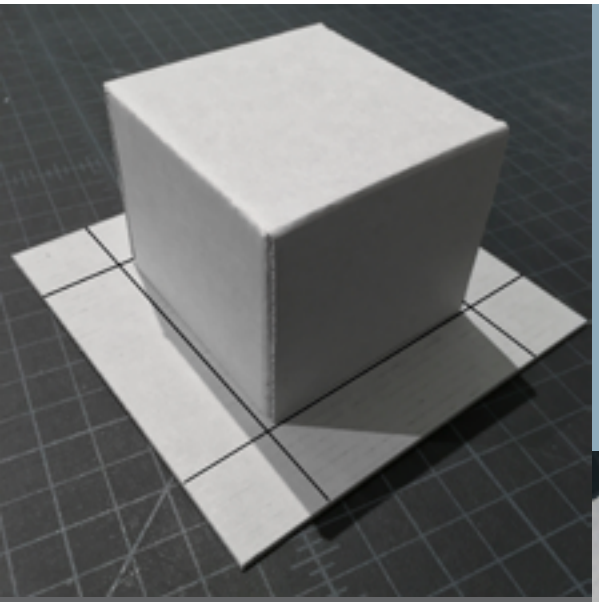
17. Test the fit of the lid after gluing each tab to ensure the lid is not too tight.

FIGURE 7
Turn the empty box upside down and place it on top of the lid to determine if the lid will fit the box.

FIGURE 8
Perforate and fold along the solid lines and cut along the dotted lines.

FIGURE 9
Use a bone folder to crease the scored board.

FIGURE 10
Fold each of the sides towards the center of the lid.



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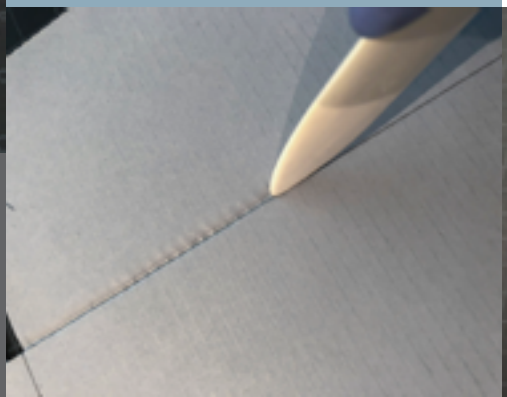

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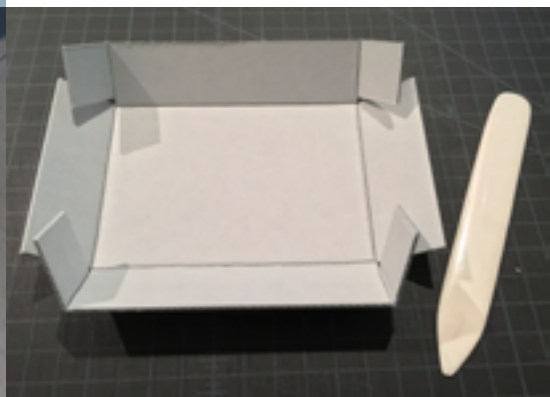

CONSTRUCTION (CONTINUED)

Custom Lid with a Polyester Film Window

1. Follow steps 1 to 14.

2. Determine the size of the window by placing the object on top of the board and carefully measuring the distance from the box wall to the object.

3. Plot the window dimensions onto the board (Figure 11).

4. Use a bone folder to crease the board and fold each of the side toward the center of the lid.

5. Cut the window out using a ruler and utility knife.

6. Test the size of the window by placing the lid on top of the box. Adjust the window size if needed.

7. Cut and apply strips of double sided tape around the perimeter of the window (Figure 12).

8. Measure and cut a piece of polyester film to fit the window with a ruler and a pair of scissors.

9. Remove the brown backing from one strip of tape and place one edge of the polyester film onto the strip of tape. Adjust the film if needed.

10. With the film in the correct position, remove the backings from the remaining strips of tape to adhere the rest of the film.

FIGURE 11
Lid with the window dimensions plotted onto the board.

FIGURE 12
Strips of double sided tape around the perimeter of the window.

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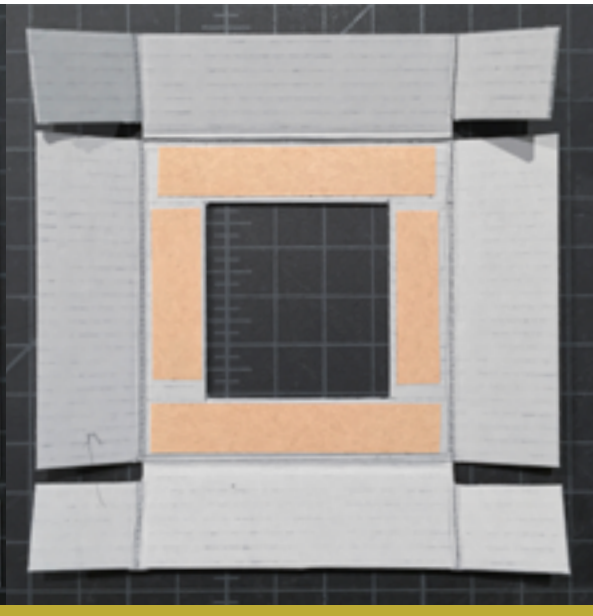

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THREE-DIMENSIONAL SUPPORTS

INTRODUCTION

Simple foam mounts are mounts that are cut from polyethylene foam rods (Figure 1) or planks (Ethafoam®) that are cut into basic three-dimensional shapes (cubes, cuboids, triangular prisms, etc.) (Figure 2). (See *Complex Foam Mounts* for modified mounts). These types of mounts are ideal for supporting and cushioning objects so that they do not shift inside of their storage containers.

The number and placement of the foam mounts needed to support an object depends on the size, shape, and weight of the object. Some objects require very few mounts (Figure 3), whereas others require many mounts. Overall, the mounts should cushion the object enough so that it does not move or roll in its storage container; the mounts should not obscure the object; and they also should be simple enough that collections users know how to remove and return the object to the container safely. In addition, when planning the location of mounts, it is important to consider areas of weakness (e.g. cracks, old repairs) of an object so that these areas are supported rather than stressed.

For small or lightweight objects, foam mounts cut from polyethylene foam rods may provide adequate structural support. Conversely, large or heavier objects will likely require foam mounts that are cut from polyethylene foam planks. If the foam mounts are cut from polyethylene foam rod, the surface of the rod is smooth enough to be in contact with the object without being lined with polyethylene foam sheeting (Volara®). However, all mounts cut from foam planks will have a rough texture and polyethylene foam sheeting must be adhered to the side of the mount that will be in contact with the object.

FIGURE 1
Simple foam mounts made from tri-rod arranged so the object is supported on all sides and is still visible.

FIGURE 2
Simple foam mounts that have been made from polyethylene planks and are lined with polyethylene foam sheeting.

FIGURE 3
Wooden combs supported by very few foam mounts.

1

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Materials, Tools, & Supplies

- Hot-melt glue gun
- Hot-melt glue sticks
- Pointed wooden skewer
- Polyethylene foam (Ethafoam®)
- Polyethylene foam sheeting (Volara®)
- Self-healing cutting mat
- Utility knife
- Optional: Corrugated blue board scraps, Foam knife, No. 2/HB pencil, Tweezers

CONSTRUCTION

1. Place the object on a flat cushioned surface and determine where the mounts should be located.

2. Select the type and size of foam needed for the mounts.

Measure and Cut Foam

3. Determine the width needed for each mount by placing a piece of foam next to the object (Figure 4). When constructing mounts for objects with irregular sides, the best approach is to start with cutting the mounts for the longest and/or most stable sides of the object and gradually working up to the smallest and/or least stable sides.

4. With a pointed wooden skewer or a pencil, mark the desired width onto the foam (Figure 4).

5. Use a utility knife to cut the mount from the larger piece of foam.

6. Trim the base of the mount using a utility knife so the angle of the mount sufficiently supports the object. Be cautious when angling mounts away from an object (Figure 5) rather than towards an object (Figure 6).

7. Repeat until enough mounts have been cut and trimmed to sufficiently support the object on all sides.

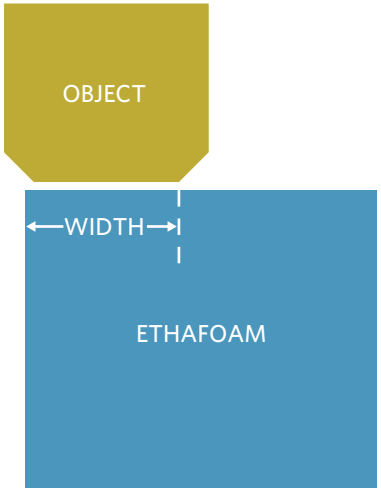

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FIGURE 4
Top view of object with a piece of foam placed next to it to measure the width for the mount. The dotted line indicates the desired width for the mount.

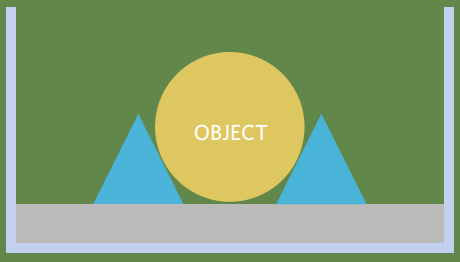

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FIGURE 5
Mounts that are angled away from an object allow for greater visibility but can allow an object to shift or roll out of place.

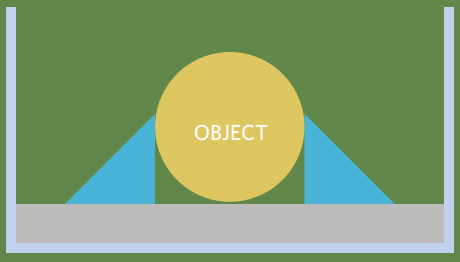

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FIGURE 6
Mounts that are angled towards a rounded or curved object can prevent an object from shifting or rolling away but can limit visibility. To support an object and provide visibility, consider alternating the angles of the mounts.

CONSTRUCTION (CONTINUED)

Gluing Mounts

8. Place the object and all the mounts inside of a box already lined with foam sheeting.

9. Use a pointed wooden skewer to outline the bases of all of the mounts onto the foam sheeting (Figure 7).

10. Remove the object from the box and safely place it to the side.

11. Remove one mount and apply hot-melt glue to the base of the mount.

12. Return the mount to the outlined area. Firmly press down onto the mount to fully adhere it to the foam sheeting.

13. Remove any excess glue with a pointed wooden skewer or a scrap piece of corrugated blue board.

14. Return the object to the box to determine if the placement of the remaining mounts is still accurate. Use a skewer to outline any mounts that need to be adjusted (Figure 8).

15. Repeat until all the mounts are adhered to the foam sheeting.

Check Stability

16. Once all the glue has cooled, place the object back inside of the box and test the stability of the mounts by gently trying to move the object in its mount, and by gently shaking the storage container.

17. If the object moves, add additional mounts, and check the stability once again.

FIGURE 7
Outline the base of the mounts onto the foam sheeting.

FIGURE 8
Check the accuracy of the remaining mount to ensure the mounts will properly support the object and prevent unnecessary movement.

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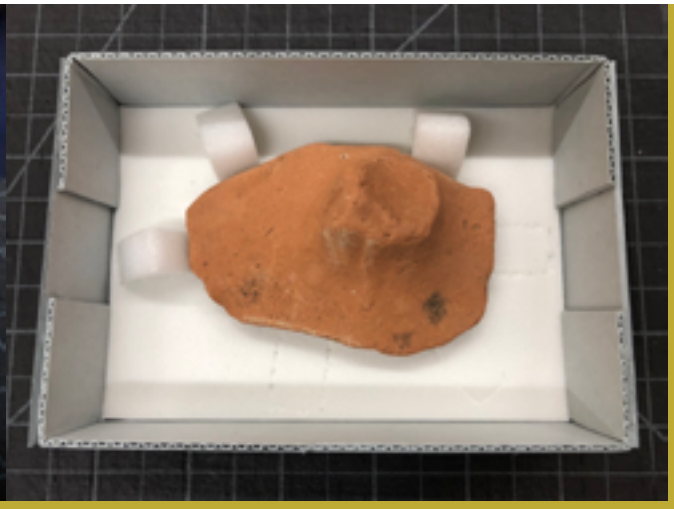

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INTRODUCTION

At JHAM, complex foam mounts are defined as mounts made from polyethylene foam rods or foam planks (Ethafoam®) that have been carved to match a specific part of an object to more adequately support it and prevent it from shifting inside of its storage container (see *Simple Foam Mounts* for unmodified mounts).

Complex foam mounts are incredibly versatile, and a utility knife or foam knife can be used to carve the mount into an infinite number of shapes and sizes. As a result, these mounts are found throughout JHAM's collection and are generally used to support curved or irregularly shaped objects of all sizes. Examples include ceramic and glass vessels, architectural fragments, and sculpture.

Since mounts cut from foam planks have a rough texture, polyethylene foam sheeting (Volara®) or a synthetic textile such as spun-bonded olefin sheeting (Tyvek®) (Figure 1) must be used to line the part(s) of the mount that will be in direct contact with the object (See *Cavity Packing* for attaching spun-bonded olefin sheeting to foam).

Often, the surfaces of these mounts do not need to be overly detailed as these details will be lost once the mount is lined with foam sheeting. Instead, the goal is to ensure that the mount safely supports the object.

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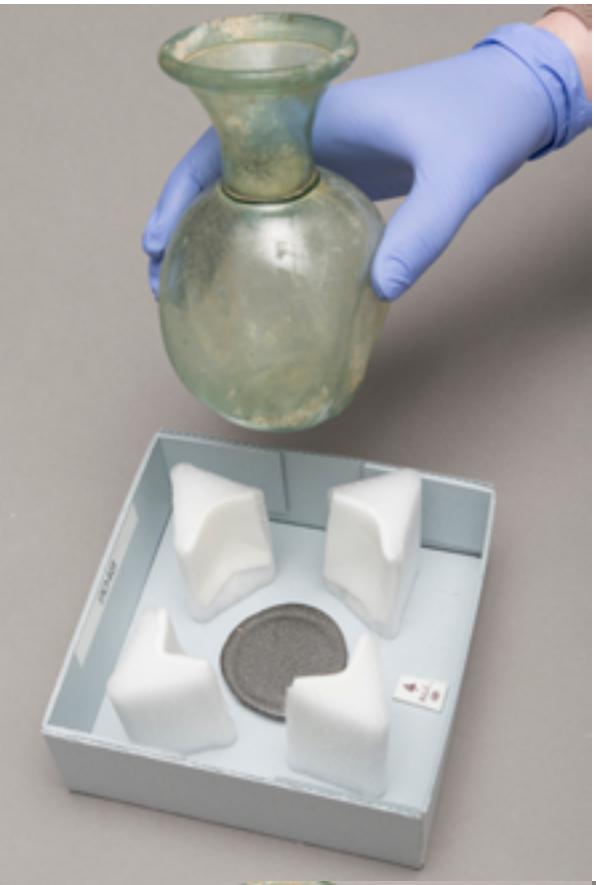

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FIGURES 1 & 2
Mounts carved to match dimensions of an ancient glass object.

3

FIGURE 3
Mounts supporting a heavy marble head. Using multiple complex foam mounts allows for greater visibility and object stability.

Materials, Tools, & Supplies

- Hot-melt glue gun
- Hot-melt glue sticks
- No. 2/HB pencil
- Pointed wooden skewer
- Polyethylene foam (Ethafoam®)
- Polyethylene foam sheeting (Volara®)
- Ruler, metal with cork backing
- Self-healing cutting mat
- Utility knife
- Optional: Contour gauge, Flexible curve, Foam knife, Spun-bonded olefin sheeting (Tyvek®)

CONSTRUCTION

1. Identify how and where a mount needs to support the object.

Measure Mount Width

2. Select the type of foam needed to construct the mount.

3. Determine the width for the mount by placing a piece of foam next to the object (Figure 4). (Depending on the object, it may be difficult to determine the correct amount of foam needed and it is best to slightly over-estimate the amount of foam needed).

4. Use a pencil or a pointed wooden skewer to mark the width on the foam.

Measure Mount Length

5. Measure the length for the mount by carefully placing a ruler next to the base of the object (Figure 5).

6. Determine where the furthest part of the object intersects with the ruler; this measurement is the minimum length for the mount.

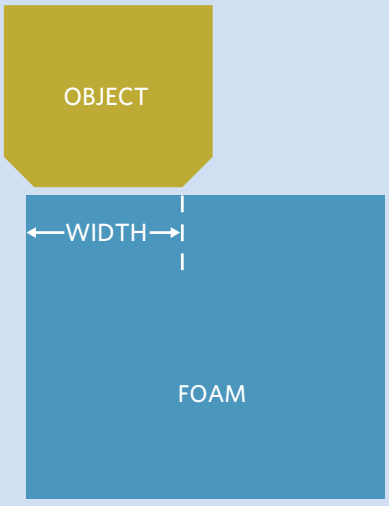
7. Add an additional 1/2 to 1 inch to the length if the object needs additional support.

8. Mark the desired length onto the foam (Figure 6).

FIGURE 4
Top view of object with a piece of foam placed next to it to measure the width needed for the mount.

FIGURE 5
Profile of object with a ruler placed at its base. The dotted line (A) represents where the farthest point of the object and the ruler intersect. The minimum length for the mount is (B) and (C) represents the additional 1/2 to 1 inch.

FIGURE 6
Top view of a piece of foam with the desired width and length for the mount.



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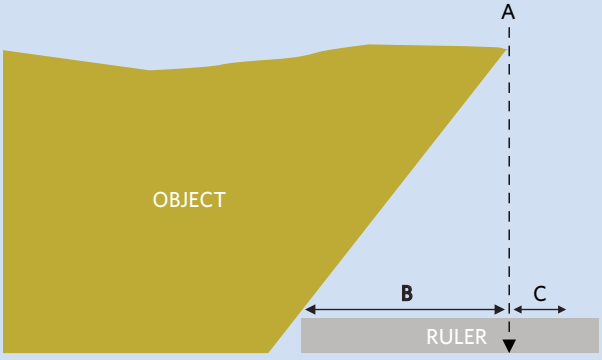

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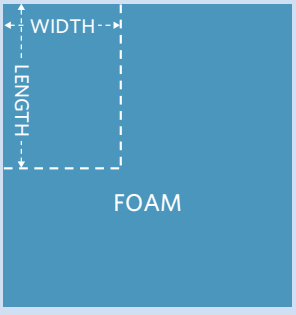

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CONSTRUCTION (CONTINUED)

Cut Mount

9. Use a foam knife or utility knife to cut the mount from the larger piece of foam and begin gradually carving the foam to match the surface of the object (Figure 7).

10. Periodically test the size and shape of the mount by placing the mount against the object. For objects with delicate surfaces, place a piece of foam or spun-bonded olefin sheeting over the mount before placing it against the object.

11. Once the desired shape of the mount is achieved, cut off any excess foam (Figure 8).

Line Mount

12. Measure a piece of foam sheeting slightly larger than the side(s) of the mount that will be in contact with the object.

13. Apply hot-melt glue to the side(s) of the mount. Apply glue close to the perimeter to ensure the edges of the foam sheeting will be fully adhere to the mount.

14. Firmly press the foam sheeting and foam mount together to adhere them securely.

15. Wait for the glue to cool.

16. Cut off the excess foam sheeting with a utility knife (Figure 9).

Glue Mount into Box

17. Place the object and the mount inside of the box.

18. Use a wooden skewer to outline the location of the mount.

19. Remove the object from the box.

20. Use a hot-melt glue gun to adhere the mount into the box.

21. Once the glue has cooled, place the object inside of the box.

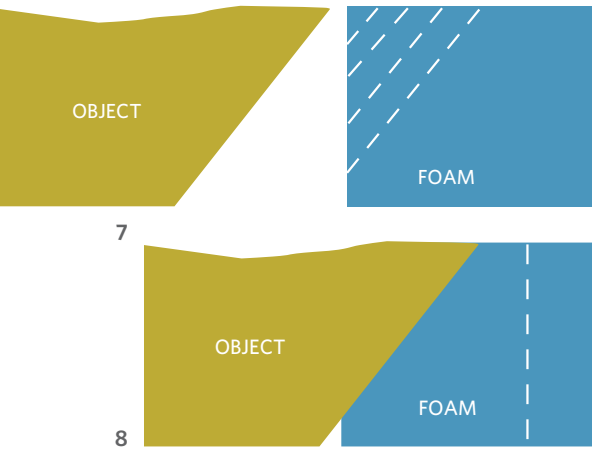

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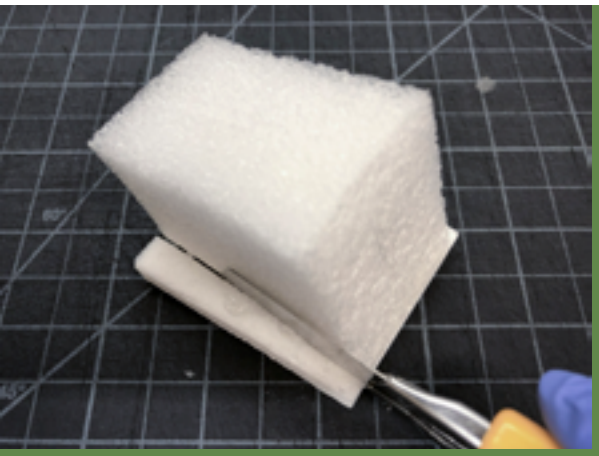
FIGURE 7
Profile of object and uncut foam, with the dotted lines indicating the gradual trimming down of the foam to match the angle of the object.

FIGURE 8
Dotted line represents where the excess foam will be removed.

FIGURE 9
Cut off excess foam sheeting once the glue has cooled.



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INTRODUCTION

At JHAM, cavity packing is defined as any mount that has a cavity carved into or all the way through a single piece of polyethylene foam that has been cut from a larger foam plank (Figure 1 and Figure 2).

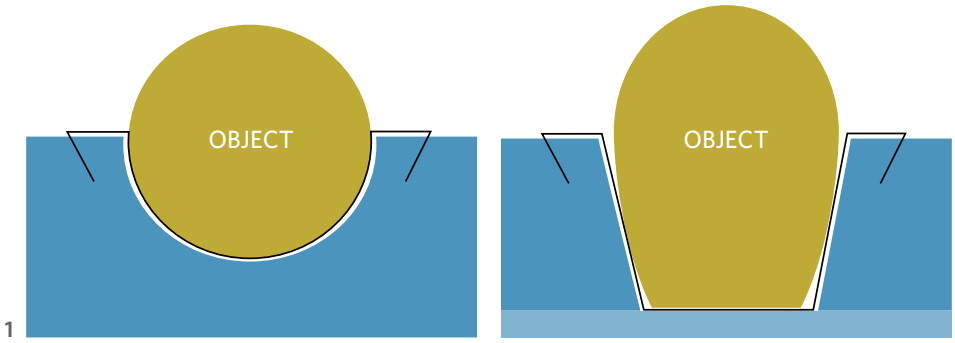
These mounts are formed by carving away the foam using a utility knife or another cutting tool until a smooth cavity has been formed. As this type of foam has a rough texture when cut, a synthetic textile such as spun-bonded olefin sheeting (Tyvek®) must be used to line the surface of the cavity (Figure 3). Polyethylene foam sheeting (Volara®) can only be used to line cavities that have smooth or straight sides because foam sheeting is not thin or flexible enough to conform to complex cavities.

Since these mounts cradle the back and sides of an object, they are ideal for objects with curved or irregularly shaped sides or bases. (For very small or delicate objects, see *Cavity Packing with Polyethylene Foam Sheeting*). As a result, these objects are best supported in custom-cut cavities that securely encircle the objects on all sides. (Figure 4). This technique is also appropriate for object transport when excessive movement of objects inside their boxes is a concern.

FIGURE 1
(Left) Cross-section depicting a cavity that is carved into the foam. (Right) Cross-section depicting a cavity that passes all the way through the foam.

FIGURE 2
An example of a ceramic vessel resting in a custom cut cavity, preventing it from rolling out of the mount.

FIGURES 3 & 4
Two small ceramic heads with curved and irregular sides. The cavities support the objects on all sides and do not obscure the objects.



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Materials, Tools, & Supplies

- Micro-spatula
- No. 2/HB pencil
- Pointed wooden skewer
- Polyethylene foam (Ethafoam®)
- Ruler, metal with cork backing
- Scissors
- Self-healing cutting mat
- Spun-bonded olefin sheeting (Tyvek®)
- Utility knife
- Weights
- Optional: Contour gauge, Flexible curve, Foam knife, Solid utility knife blades (Olfa® L-SOL-B), Wooden tooth picks, X-ACTO® knife

CONSTRUCTION

Measure and Cut Foam Plank

1. Place the object on top of a foam plank. Use weights to stabilize the object.

2. Carefully measure the desired length and width for the mount with a ruler. Record the measurements on a piece of paper.

3. Remove the object from the foam and safely set it to the side.

4. Use a pointed wooden skewer or pencil to mark the desired length and width onto the foam.

5. Place the foam plank onto a self-healing cutting mat and use a utility knife or foam knife to cut the mount from the foam plank.

Outline Object onto Mount

6. Place the object on top of the mount and stabilize it with weights.

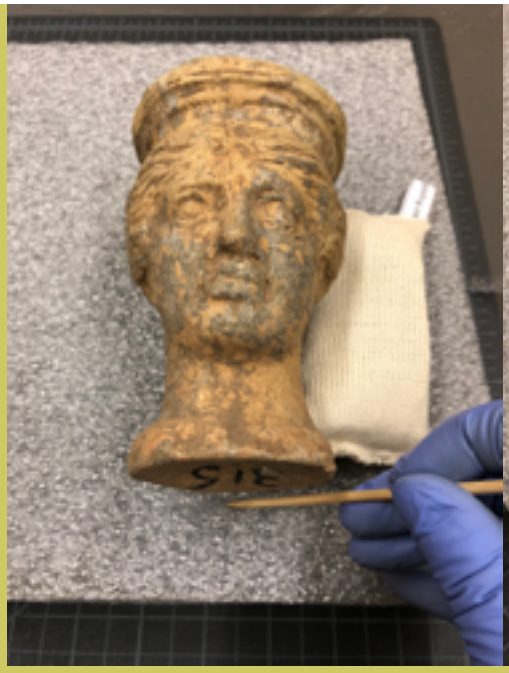
7. Use a pointed wooden skewer, a pencil, or wooden tooth picks to trace an outline around the object (Figure 5 and Figure 6).

8. Remove the object from the foam and safely set it to the side.

Cut the Cavity

9. Use a utility knife to cut along the outline and form the cavity by gradually carving the foam away (Figure 7).

5



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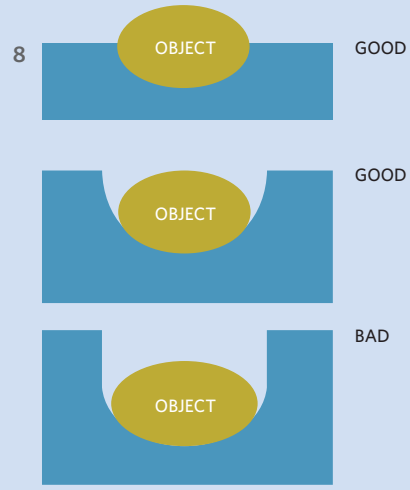
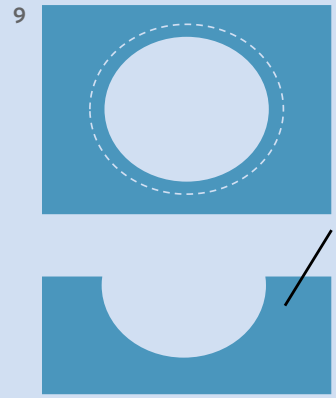
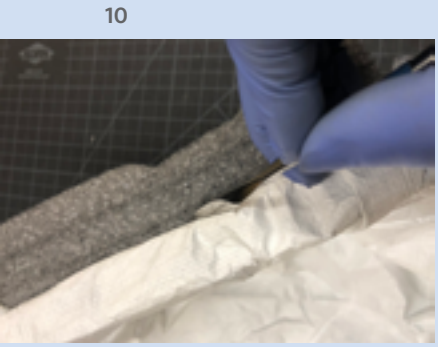
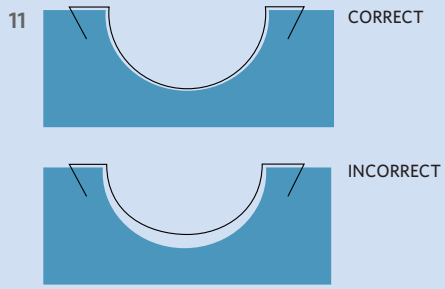








CONSTRUCTION (CONTINUED)

10. The size and shape of the cavity will vary from object to object (Figure 8). However, a cavity should never be so deep that the object is difficult to remove and there should always be enough space for an individual to safely support and lift the object from the cavity.

11. Periodically test the size and shape of the cavity by placing the object inside the cavity. For objects with delicate surfaces, drape a piece of spun-bonded olefin sheeting over the foam before placing the object in the cavity.

Line the Cavity

12. Once the cavity is the correct size and shape, use a utility knife to cut a 45-degree channel around the perimeter of the cavity (Figure 9). The channel should be between 1/4 inch to 1 inch away from the cavity and 1/4 to 3/4 inch deep.

13. With a pair of scissors, cut a sheet of spun-bonded olefin sheeting. The sheet must cover the entire surface of the cavity and extend past the channel by approximately 3/4 inch to 1 inch.

14. Drape the spun-bonded olefin sheeting over the cavity.

15. To help keep the sheeting flush against the surface of the cavity, place a weight inside of the cavity to imitate the shape of the object.

16. Use a micro-spatula or a wooden skewer to tuck the sheeting into the channel (Figure 10).

17. Periodically cut off any excess sheeting using a pair of scissors.

18. The finished lining should be as smooth as possible (i.e. free of wrinkles) and flush against the sides and bottom of the cavity, but not so taut that the lining hovers above the cavity (Figure 11).

FIGURE 8
(Top) Cavity depth for robust objects can be equal to half the height of the object. (Middle) Cavity depth for fragile objects or objects being transported can be equal to the height of the object. (Bottom) Cavity depth should never exceed the height of the object.

FIGURE 9
(Top) Top view of the foam and cavity with the dotted line representing the placement of the 45-degree channel. (Bottom) Cross-section showing the depth of the 45-degree channel.

FIGURE 10
Tucking the sheeting into the channel.

FIGURE 11
(Top) Cross-section with sheeting flush against the bottom and sides of the cavity. (Bottom) Cross-section with sheeting that is too taut and hovers above the cavity.

INTRODUCTION

Cavity packing with polyethylene foam sheeting is a mount made from a single piece of 1/4 inch thick polyethylene foam sheeting (Volara®) and has one or more cavities cut straight through the foam (Figure 1).

This versatile mount is ideal for small or delicate objects that would not be sufficiently supported by foam mounts or would not be easily visible if housed in polyethylene zip-top bags (Figure 2). Examples include small faience objects, earrings, rings, cylinder seals, and stone tools. Like cavity packing with polyethylene foam planks (Ethafoam®), this mount can be used for objects with curved or irregularly shaped sides or unstable bases that are best supported in cavities that encircle the objects on all sides. Since polyethylene foam sheeting can be in direct contact with objects, it does not need to be lined. The unique contours of the cavity make it easier for a collection user to correctly orient the object in its mount.

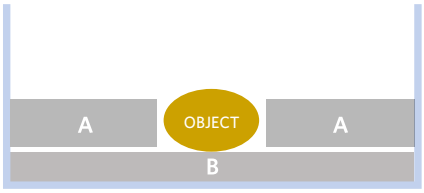
Cavity Packing with Foam Sheeting and Mounts

Depending on the size and shape of the object, foam mounts can be cut and adhered to the surface of the foam sheeting to prevent an object from shifting or tipping out of its cavity (Figure 4). This method is especially useful for rounded and irregularly shaped objects (Figure 5).

Thin Objects

Cavity packing with foam sheeting can also be modified with a twill tape pulls to house thin objects so that they can be easily removed from the mount (Figures 6 and 7). By gently lifting the twill tape pull, the object lifts smoothly from the shallow cavity, allowing safer removal.

FIGURE 1
Cross-section of completed mount. The 1/4 inch thick piece of foam (A) has a cavity cut through it and is adhere to a 1/8 inch thick piece of foam (B), which lines the bottom of a box.



1

FIGURE 2
A delicate faience amulet of the goddess Taweret is too small for foam mounts and would not be easily visible if housed in a polyethylene zip-

2

Materials, Tools, & Supplies

- Hot-melt glue gun
- Hot-melt glue sticks
- No. 2/HB pencil
- Pointed wooden skewer
- Polyethylene foam (Ethafoam®)
- Polyethylene foam sheeting (Volara®)
- Ruler
- Scalpel
- Scissors
- Self-healing cutting mat
- Twill tape
- Utility knife
- X-ACTO® knife

FIGURE 3
Use a pointed skewer to outline the object onto the foam sheeting.

FIGURE 4
Cross-section of mount with foam mounts (C) to house rounded (top) and irregularly shaped (bottom) objects.

CONSTRUCTION

Line Bottom of Box

1. Place a piece of 1/8 inch thick foam sheeting onto a self-healing cutting mat. Use a ruler and utility knife to measure and cut the foam to fit flush with the bottom of a blue board box.

2. Adhere the foam to the bottom of the box with a hot-melt glue gun (Figure 1).

Cut Cavity

3. Place a piece of 1/4 inch thick foam sheeting onto a self-healing cutting mat. Measure and cut the foam to fit flush inside of the same box as the 1/8 inch thick foam sheeting.

4. Return the foam sheeting to the self-healing cutting mat and carefully place the object on top of the foam.

6. Remove the object and safely set it to the side.

7. Use an X-ACTO® knife or scalpel to cut along the outline to form the cavity (Figure 3).

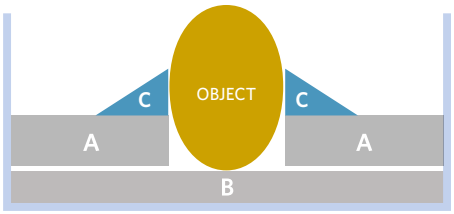
8. Test the size and shape of the cavity by placing the object into the cavity. Adjust the size and shape of the cavity if needed.

Adhere Mount into Box

9. Set the object safely to the side and apply hot-melt glue to the bottom of the mount.

10. Place the mount into the box and firmly press down to fully adhere it to the 1/8 inch thick piece of foam sheeting.

11. Once the glue has cooled, place the object into the cavity.



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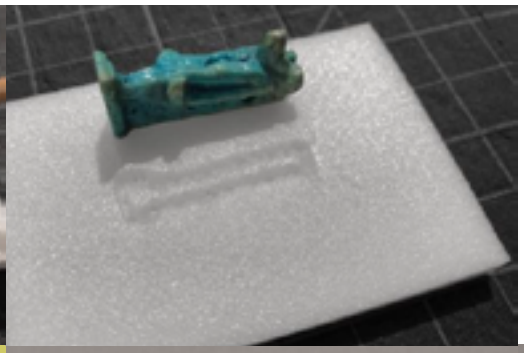
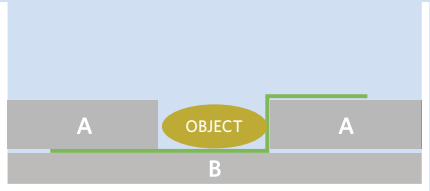


FIGURE 5
Plaster wall fragment with uneven base and sides. The shallow cavity encircles the base, the mounts prevent it from tipping out of the box.

5



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7

8

9

CONSTRUCTION (CONTINUED)

Variation

Cavity Packing with Foam Sheeting and Mounts

1. Follow steps to 1 to 11.

2. Cut polyethylene foam mounts to support the object (see the *Three-Dimensional Supports* section).

3. Use a hot-melt glue gun to adhere the foam mounts to the surface of the foam.

4. Wait for the glue to cool before placing the object into the cavity.

Thin Mounts

1. Follow steps 1 to 8.

2. With a pair of scissors cut a piece of twill tape. The length will vary from object to object.

3. Tie a small knot on one end of the twill tape to prevent it from unraveling (Figure 9).

4. Fray the other end of the twill tape so it is fanned out (Figure 8); this end will be adhered to the underside of the mount.

5. Determine the best location and placement for the pull based on the condition and construction of the object. The pull should always be placed under a robust and stable part of an object.

6. Turn the mount over and use a pointed wooden skewer to outline location and placement where the frayed end of the pull will be adhered.

7. Adhere the frayed end of the pull to the mount by applying a small amount of glue within the outlined. Press the frayed end of the pull into the glue with a skewer (Figure 9). Wait for the glue to cool.

8. Pull the knotted end of the pull through the cavity and apply glue across the bottom of the mount (Figure 9).

9. Place the mount into the box and apply pressure to fully adhere it to the bottom of the box.

10. Place the object into the mount once the glue has cooled.

FIGURE 6
Cross-section showing the placement of the twill tape between the two pieces of foam sheeting.

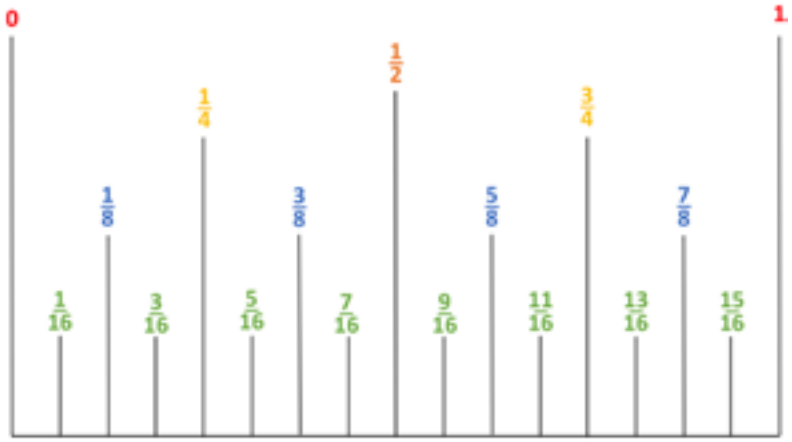
FIGURE 7
Thin copper alloy spear blade with a twill tape pull.

FIGURE 8
Fray one end of the twill tape.

FIGURE 9
Adhere the frayed end of pull to the underside of the foam. Pull the knotted end through the cavity.

RESOURCES

DIAGRAM OF RULER MEASUREMENTS



CONVERSION CHART: FRACTION TO DECIMAL	
1/16	0.0625
1/8	0.125
3/16	0.1875
1/4	**0.25**
5/16	0.3125
3/8	0.375
7/16	0.4375
1/2	**0.5**
9/16	0.5625
5/8	0.625
11/16	0.6875
3/4	**0.75**
13/16	0.8125
7/8	0.875
15/16	0.9375

MUSEUM SUPPLIERS

American Alliance of Museum (AAM) Marketplace
www.museummarketplace.com

Archival Methods
230-2 Middle Rd.
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Phone (USA): 1 (866) 877-7050
Phone (International): (585) 334-7050
www.archivalmethods.com

Benchmark Catalog
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Phone: (609) 397-1131
ask@benchmarkcatalog.com
www.benchmarkcatalog.com

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Phone: 1 (800) 448-6160 (USA) or
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(USA) or
international@gaylord.com
(International)
www.gaylord.com

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Commerce, CA 90040
Phone: 1 (800) 862-2228
Fax: 1 (888) 822-6937
or
9401 Northeast Dr.
Fredericksburg, VA 22408
Phone: 1 (800) 634-0491
Fax: 1 (800) 947-8814
info@hollingermetaledge.com
www.hollingermetaledge.com

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Brooklyn, NY 11211
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www.talasonline.com

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www.universityproducts.com

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Dallas, TX 75244
Phone: 1 (800) 666-2241
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Fisher Scientific
300 Industry Drive
Pittsburgh, PA 15275
Phone: 1 (800) 766-7000
Fax: 1 (800) 926-1166
www.fishersci.com

Grainger
100 Grainger Pkwy.
Lake Forest, IL 60045
Phone: 1 (800) 472-4643
www.grainger.com

Sakura Color Products of America, Inc.
30780 San Clemente St.
Hayward, CA 94544
www.pigmamicron.com

ULINE
12575 Uline Drive
Pleasant Prairie, WI 53158
Phone: 1 (800) 295-5510
Fax: 1 (800) 295-5571
customer.service@uline.com
www.uline.com

*Inclusion in the list is not an endorsement

The following resources may provide both professional guidance and visual inspiration for collections' housing projects.

3M. "3M™ Double Coated Tape 415". Double Sided Tapes. Accessed May 10, 2018. https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Double-Coated-Tape-415/?N=5002385+3293242049&rt=rud.

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Phoebe A. Hearst Museum of Anthropology blog archive: https://web.archive.org/web/20160319183139/http://hearstmuseum.berkeley.edu/blog?page=1.

Pinterest: www.pinterest.com. Pinterest can be an excellent resource for finding creative and elaborate box structures adaptable for museum use. Search terms include: museum storage; box structures; clamshell box; structural packaging; cartonnage box; museum conservation.

Preparation, Art Handling, Collections Care Information Network (PACCIN): www.paccin.org

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Wojahn, Juhl. Archival Mountmaking: Complex Mounts. 2016. Accessed March 16, 2018. http://slideplayer.com/slide/3935697/.

YouTube: www.Youtube.com. While YouTube is not a robust source for rehousing tutorials, some videos available may be useful for beginners. Search terms include: museum mounts; cavity mounts; museum storage.

MAINTAINING COLLECTIONS RECORDS AT THE JOHNS HOPKINS ARCHAEOLOGICAL MUSEUM

by Katherine J. Gallagher

Maintaining collections records may seem secondary to the preservation of the objects themselves; however, the preservation of collections documentation and associated data is as important in maintaining the integrity and value of a collection. For museums with small staff, the task may seem overwhelming as well as secondary to the physical care and exhibition of a collection. Nonetheless, a primary responsibility of collections stewards is to care for and preserve not only the physical properties of objects in a collection, but also data generated about the objects. An object's ownership history (provenance), production history, publication history, technical analyses, and uses are a few examples of types of data documented about museum collections. Museums do this through consistent, detailed documentation, robust filing systems and methodical tracking of acquisitions, object locations, exhibitions, and loans. For older, small collections such as the Johns Hopkins Archaeological Museum's (JHAM), much of this information was never known or was not maintained consistently over its more than one hundred and thirty years creating gaps in our understanding of the use of the collection and allowing the disassociation of objects from their histories. Over the course of the project to rehouse the JHAM collection, the staff was reminded of the importance of maintaining data about our collection when presented with the simple but not always straightforward tasks of object tracking and housing labeling. This led to the development and maintenance of the three basic systems presented here. With some planning, even a small staff like that of JHAM, can more appropriately steward a collection, thus preserving the integrity of its history and supporting future research and enjoyment.

In this appendix, the three practical systems now in place to document and preserve information about the JHAM collection are presented: an accession register, a relational database, and Object Files. The core step to the success of these systems is the assignment of a unique identifying number for each object. Often, the dissociation of an object from its history is simply due to the lack of knowing an accession or inventory number for an object. Not knowing the number may be due to the lack of an initial number assignment, the illegibility or loss of a number physically applied to the object, or the confusion from past renumbering of a collection that was not thoroughly documented.

The multi-year IMLS-funded rehousing grant awarded to JHAM necessitated the inventory and more thorough documentation of objects in the collection, providing the opportunity to reconnect objects with past inventory and accession numbers, and thus their histories. Relinking objects with collections records increases the teaching value of objects in support of the JHAM mission as a teaching and research collection. To be able to complete this work in a systematic and consistent manner, newly established procedures were created following best museum practices (Buck and Gilmore 2010) to document the process and ensure the maintenance and continual documentation of the use of the objects and new knowledge generated about the collection.

THE COLLECTION

Johns Hopkins University purposefully started the collection in 1882 as a teaching collection. As it was started as a hands-on teaching collection closely associated with individual departments, its administration and care fell to faculty members and students and occasionally professional museum staff. Due to this history, the museum's documentation and records have melded with other campus museums, and departmental and university administrative archives. The most comprehensive information about individual objects is a set of catalog cards created in the 1930s that provide inventory numbers and basic physical descriptions for many objects. For some objects in the collection, these cards contain provenience and donor information. The inventory numbers listed on the cards were applied to objects possibly in the 1940s and have varying levels of legibility today. Often, one number was assigned to a group of objects that share a common trait – e.g. physical description or provenience. To add to the complexity of sorting the collection, currently there are no less than eleven numbering systems being used for the objects and often the systems overlap. Objects can have up to 3 numbers and may include a number that does not correlate to any catalog cards. Currently, the staff estimates about 9,000 objects in the collection.

ACCESSION AND FOUND IN COLLECTION REGISTERS

Historically, museums have used bound paper logs or registers to record items that come into a collection. Bound "accession registers" made of acid-free paper can be purchased online at archival suppliers (Figure 1). These commercially produced registers are pre-printed with the basic headings required to properly record new acquisitions to a collection. A pigment-based pen such as a Pigma Micron™ pen is used to fill out the register. An original accession ledger has not been located for the collection so a new ledger was started in 2014 to record recent and future accessions.

The first piece of information recorded in a register is the accession number (Figure 2). An accession number references an acceptance into a collection and can represent an individual or group of objects obtained by the museum in one transaction such as one gift from a donor or one purchase from an auction. This number therefore represents a transaction between the previous owner of the object and the new owner, the museum. Donors can be associated with multiple accessions if they repeatedly donate to the museum; similarly, auction houses can also have multiple accession numbers associated with them. The new accession number is recorded in the ledger along with a simple list of the objects included in the transaction. Object form (shape), material, color, and overall size measurements are usually included for our new accessions. How objects are described in the ledger will vary by museum depending on the collection and how quickly objects will be cataloged. Information to always include in the accession ledger to assist in proof of ownership is the date of acquisition, the type of acquisition transaction (e.g. donation, bequests, purchase), the name of the previous owner, and a physical description of the accession with enough detail to allow for its distinction from similar accessions already in the collection.

FIGURE 1
Acid-free, bound accession register with preferred writing tool, a pigment-based ink pen.

1

As mentioned earlier, an essential aspect of maintaining museum records is assigning each object a unique identifying number. The JHAM currently follows the common protocol described by Buck and Gilmore (2010) of assigning a two-part accession number to each donation: the year of the gift (for example, 2018) followed by a sequential number enumerating the number of gifts within that year. Therefore, the fifth donation in 2018 would be given the accession number 2018.05. Each item within that fifth donation would be given its unique number. For example, if three vessels are given in the 2018.05 accession, the vessels will be identified as 2018.05.001, 2018.05.002, 2018.05.003. These numbers should be recorded in a column of the accession ledger.

An object's unique accession number is used to identify the object in all museum records such as the database, exhibition files, and loan documentation. The object is also labeled with this number by physically applying the number on the object, writing it on a tag tied to the object, and numbering its housing container (See Storage Container Labeling). In institutions with registration and conservation staff, numbers are often painted on or adhered to objects; consult with a museum specialist before considering these more invasive and potentially irreversible methods.

In the early years of the JHAM teaching collection, this was not the numbering system used. Often the university acquired complete collections created by individuals and the collections were not renumbered at the time of acquisition. A common practice for private collectors is to number their objects sequentially beginning with "1." While this is preferable to not numbering a collection at all, it poses a conundrum for institutions like JHAM that have acquired several private

FIGURE 2
Sample Accession Ledger Entries.

Accesion Number	Date Received	Description	Received From	How Acquired	Remarks	Catalog Number
FIC. 2018.001	1/15/18	A Late Bronze age Cypriot red slipped ceramic vessel in the shape of a standing bull with handle on back and nose as spout. 18cm L x 6.4cm W x 12.3cm H.	Mr. & Mrs. Arthur Collector (JHU 1960) 11 Main Street, Balto, MD 21218	Gift	Purchased by donor in auction in Sept. 1 1964, Sotheby's NYC	2019.01.001
FIC. 2018.002	6/12/19	Three Roman ceramic oil lamps. (.002) Red, 1 nozzle, 1 handle, chariot scene moving left; (.003) Red, 1 nozzle, reconstructed handle, leaping ram; (.004) Black, 3 nozzles, triangular handle, satyr face; corner of handle missing. "CY" written on break.	Mr. John Q. Student (JHU 1947) stone samples	Bequest	Inherited by donor from father who travelled to Rome in 1922.	2019.01.002 to .004

collections, many with their own inventory systems. In the past, collections stewards at Hopkins have approached this problem in different ways, resulting in the creation of multiple numbering systems. For one collection, the collector's initials were added as a prefix to the inventory (e.g. HT 35). For other collections, ranges of numbers was assigned to each collector, a common method for assigning numbers to collections, but one that often causes confusion in managing a collection later. For example, the range 2000-2999 was reserved for a particular collector and 3000-3999 for another. The reservation of blocks of numbers to indicate important information such as collector, material type, or geographic origin is not recommended as often numbers in the range are not needed and remain unassigned. Having unassigned numbers in the middle of assigned numbers causes confusion as to what numbers have been used and can prevent efficient tabulation of the size of a collection.

Private collectors commonly use one number to identify multiple objects that share a common characteristic such as material type or findspot, its excavation location. In some cases, JHAM has one number that represent up to 30 objects! Having multiple objects share a number makes it impossible to track the movement, use, research and care of individual objects within the group in an efficient manner and digitally. To remedy this issue, it was decided to create a unique object number while maintaining the objects connection with its original object number in the following manner. For example, if 30 beads share the number HT 1000, they are now re-numbered HT 1000.1, HT 1000.2...HT1000.30. To assist in this number reassignment, a simple form was developed to record the old and new number, explain the reasoning behind this change, and document a physical description of each object. The form also includes a checklist of all records that need to be updated with the new number such as old inventories, photographs, and loan files. Also tracked on this form is when these changed were made and when they were added to the database. A paper copy of the form is stored in a designated binder and the original is placed in the Object File folder (see below).

During the rehousing of the entire collection, we encountered many objects that do not have an assigned accession or inventory number; these objects were therefore assigned "found in collection" or "FIC" numbers using a numbering system based on the FIC assignment process suggested in Buck and Gilmore (2010). Because paper records are critical for the documentation of a collection and due to the large volume of never numbered objects encountered, we established a paper register in addition to the Accession Register to record the assignment of FIC numbers (Figure 3). FIC numbers are created in a way similar to formal accession numbers: the abbreviation "FIC" is followed by the year the number is assigned, followed by a sequential number. For example, "FIC.2018.095" is given for the 95th object assigned an FIC number in 2018. These FIC numbers are recorded in a separate paper ledger similar to the accession ledger previously mentioned. Columns in the ledger are modified to be more appropriate for the information we record such as a brief description that includes material, color, overall size measurements and any unique identifying marks such as an applied label or unusual breaks. The column used for recording how the object was acquired in the accession ledger is used to record any information or clues that might assist in identifying the means of acquisition in the future such as remnants of an accession number or style of applied labels that are now illegible. The object and its new accession number are documented in a digital photograph. The new number and information from the ledger is immediately entered into the database and the photograph is uploaded.

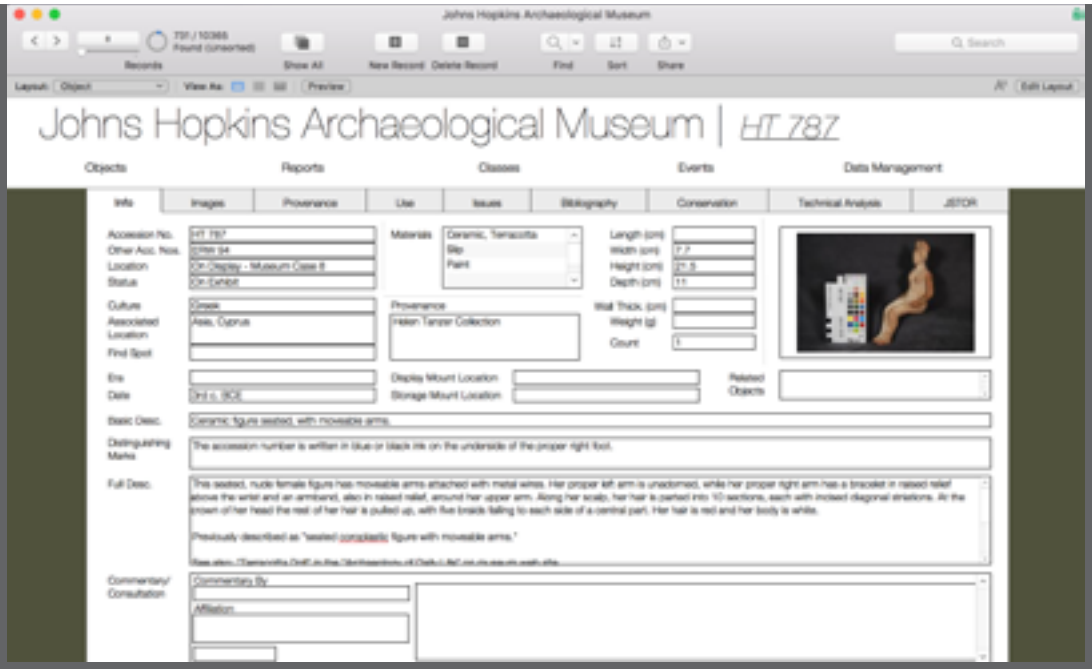
FIGURE 3
Sample FIC Ledger Entries. For the FIC ledger, the "Catalog Number" column is used to record how the objects had been entered in the "Accession No." field in the database or to record if it had no entry in the database.

Accesion Number	Date Assigned	Description	Received From	How Acquired	Remarks	Catalog Number
FIC. 2018.001	1/15/18	Database Entry: "stone, basalt worked piece"; 4 sides worked, broken. 11.6x1.6x0.9cm	Remnants of red edged paper tag		Renumbered 861 (basalt weight) / KJG 9/4/18	"No Number"
FIC. 2018.002	1/15/18	Cypriot rim sherd with handle; buff body. Handle is dark grayish brown and body is decorated with dark grayish brown lines. 6.7x9.9x0.6cm. "CY" written on break.	Was found in box with other unnumbered stone samples			[not in database]

THE DATABASE

In addition to a paper register, the JHAM uses a digital relational database to record and organize detailed information about each object in the collection. Objects are described in more detail in the database than in the accession ledger. Databases allow for easy sorting of the collection by recorded attributes as well as export of information as needed. JHAM uses FileMaker Pro ™ software, which is flexible and customizable for our needs (Figure 4). Many smaller museums may not have the staff and financial resources to implement a complex database, but for small collections, a simple Excel or Google sheets spreadsheet may be sufficient. No matter what system—paper or digital—is chosen, it is essential that collections stewards maintain a physical copy of their inventory, and ensure that a backup of all digital files, including the database, is stored remotely.

FIGURE 4
Example of an object entry in the Johns Hopkins Archaeological Museum Filemaker Pro™ database



We approach the documentation of every object in a consistent manner. By recording information in the same order through the same process, vital information is not likely to be missed, and when information is not known, it can be easily noted as such. This does not mean you should limit your information – everything should be recorded. If needed, create a field called "Notes," to hold the information that does not fit elsewhere. Critical information to be recorded for each item, when known, includes:

- Current location of an object
- Status of the object (In Storage, On Exhibit, On Loan, Deaccessioned, Unknown)
- Material(s) used to make the object
- Measurements (Height, Length, Width, Weight, each in their own fields, using consistent units). The JHAM uses centimeters (cm) and grams (g).
- A physical description that includes any unique traits of the object. This information may assist in identifying it from similar objects (e.g. "a red jar with one intact handle and one handle missing, and a red jar with two handles and a 3cm area of loss on the foot ring rather than "2 red ceramic handled jars")
- Individual object photographic digital images (RAW and .jpg formats preferable). At least one image should include the object number and a scale, which could be a professional photography scale (available form photography and forestry retailers) or a simple ruler.
- The object ownership history, or provenance, such as how (gift, purchase), from whom, when and where it was acquired, if known.
- Where and when the object was made and by whom, if known.
- Why this object in particular was collected, if known.

A glossary of standardized terms and abbreviations used in writing descriptions is very helpful for current catalogers. The glossary can also be of tremendous value to future researchers and users of a collection who may not understand the meaning of common terms used in cataloguing currently. Terms used to describe artifacts are often regionally and culturally specific and can imply additional information. For example, while "flint" is a stone to all archaeologists, the term may imply a particular color and source depending on a researcher's regional specialization. Standardization of terms and consistency in how information is recorded is particularly important to facilitate efficient sorting and reorganization of digital data that is required in collections care. In order to maintain consistent documentation, JHAM creates cataloging guides and workflows for staff to reference. Workflows include information such as preferred terms, the steps for cataloging, and the appropriate ordering of information in written descriptions. To write a brief description of a glass vessel, for example, the color of the glass is mentioned at the beginning of the sentence followed by the object's form or shape description and concludes with any unique characteristics such as areas of discoloration, breaks or missing elements. Having a standard organization to object descriptions allows for quick access to data for catalog users when scanning multiple entries of similar items. Workflows are tested with a few examples from the collection, modified to be clear for catalogers, and continually updated as they are used. These documents are especially useful for small museums that rely on volunteers and students for data entry, and therefore often have a high staff turnover rate. Having a document to refer to also allows catalogers to work more independently, freeing up museum staff for other tasks.

OBJECT FILES

Organizing original paperwork related to the ownership, care, and research of items in a collection is important for understanding your collection, but is also essential for legal purposes such as proof of ownership. At the JHAM, we maintain a paper file folder for each object in the collection, referred to as the "Object File." Documentation pertinent to the object is filed in an acid-free folder labeled with a printed label such as those used to number our housing containers (See Storage Container Labeling). The files are organized by object number and access to the files is restricted to professional museum staff. Documentation in the file can include historical or archival information, purchase receipts, obsolete accession tags, exhibition catalogs, research notes, appraisals, conservation reports, photographs, copies of loan paperwork and a printout of our database entry for the object. The object number is written in #2 pencil on the lower right corner of each document in the file if the number is not already printed on the item; this creates

a connection between the object and the information and assists in quick filing when the document has been removed from the file for consultation. As of 2014, objects that generated paperwork were the only objects to have Object File folders. We found this caused the issue of duplicate folders for a single object when a staff member removed a folder for use and then another staff member made a new folder assuming one had not been made yet. To remedy this, an Object File folder was made for every object in our database. In addition, when a folder is removed, a "file out" card that records when the file was removed and by whom replaces it until the folder is returned. "File out" cards are available at office supply stores.

Using accession ledgers, developing databases, and maintaining Object Files are not new practices for museums. However, for small museums with small staff size like the JHAM, consistently establishing and maintaining these three simple practices may seem overwhelming and non-essential and thus become secondary to the physical care of a collection. Over time, information about individual objects is lost or becomes disassociated. A basic ledger, a rudimentary database, and simply organized paper files create a robust and effective registration system when tied together with a unique number for each object. The rehousing project undertaken at JHAM highlighted shortcomings in our collection numbering system and filing procedures. Developing and refining our approach to these three simple practices improved our ability to fulfill our ethical and professional responsibility of stewarding, not just the individual objects themselves, but their histories and uses as a teaching collection. Not only were histories rediscovered and provenance documented, but procedures were established to ensure the continual documentation of new research and discoveries, thereby increasing the pedagogical value and instructional possibilities of the collection.

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ABSTRACT FOR "REHOUSING A 'WORKING COLLECTION': PERSPECTIVES FROM THE JOHNS HOPKINS UNIVERSITY ARCHAEOLOGICAL MUSEUM"

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Abstract
Using the Johns Hopkins Archaeological Museum (JHAM) as a case study, this article explores the unique approaches used to rehouse a collection with a core teaching mission. Unlike the collections of more traditional museums, the JHAM's holdings are meant to be used by students, faculty, and researchers as a means of pursuing knowledge. Supporting this pedagogical mission requires innovative rehousing approaches that protect the collection while ensuring its use. This paper discusses recently implemented rehousing strategies that emphasize high visibility, ease of accessibility, and guided handling of objects, and considers the unique challenges and advantages of providing access to such a collection. Rehousing is also posited as only one aspect of collections care; rather, the authors propose that a more holistic approach to the long-term preservation of objects in the museum's care encompasses not only their physical stability through rehousing and conservation, but also the stability and stewardship of their provenance histories and collection data. The ultimate goal of these various modes of care should be ensuring that the collection "works" such that the use of objects maintains and extends their meanings and utility.

Keywords:
Rehousing, teaching collection, university museum, archaeological objects

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