



# Advice for Museums

## Collections Care Training

### Object Handling and Packing Guidelines

These guidelines set out a minimum standard for handling and packing museum collections by staff and volunteers at National Museums Scotland.

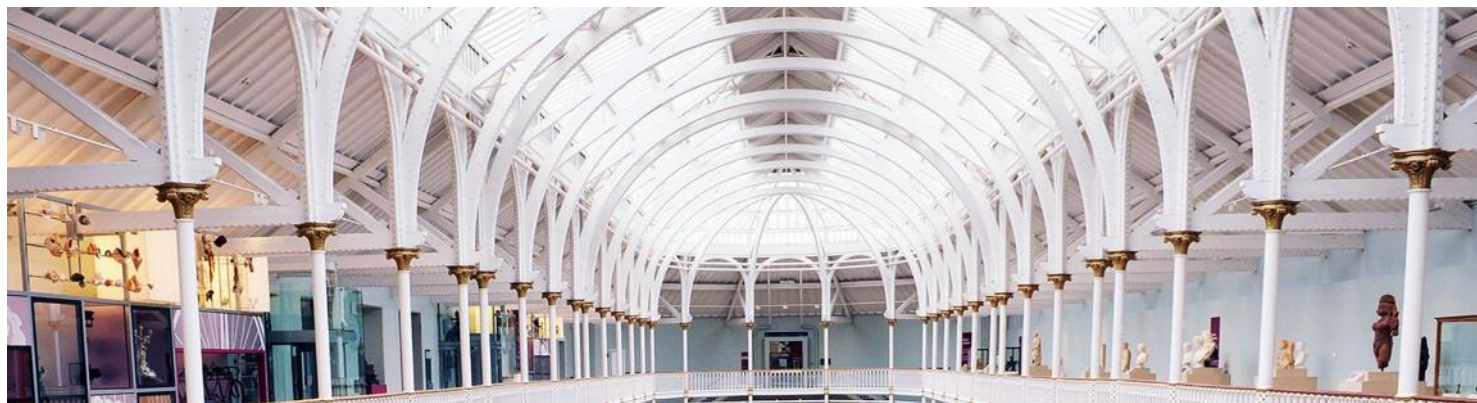
As part of the National Training Programme, these guidelines have made available for you to use with your own museum staff and volunteers.

Museum objects are at a high risk of accidental damage when they are being handled or moved. It is therefore important to handle all objects in the correct and most appropriate way. Preventive conservation starts with careful handling. Some objects may need even greater care and some will be too fragile to move at all without specialist advice.

Damage caused by handling is often cumulative and not immediately apparent to the user. Forward planning will vastly reduce the risk of damage to an object.

If in any doubt how to handle an object, or are unsure whether an object is sufficiently robust to be moved please consult a specialist before attempting to move the object yourself.

If you have any questions relating to this resource, please contact [partnerships@nms.ac.uk](mailto:partnerships@nms.ac.uk)



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### GENERAL PACKING GUIDELINES

# 1. General Guidelines

## ***Prepare before you move***

- Before moving objects within or between buildings always decide on the route that an object will take before starting. Assess the options for using different lifts within the buildings to plan the safest route. The shortest route may not always be the safest. Make sure all obstructions have been moved, that doors will be open or someone will be available to open all doors for you. Make sure the space where the object is going to is prepared and clear.
- It is always safer to use trolleys, trays or other moving equipment, than to directly carry an object by yourself however short the move.
- Prepare for handling objects. Avoid wearing anything that may damage objects by scratching or snagging. Take off sharp jewellery, watch straps, museum swipe cards. If you are wearing a belt or clothes with sharp buttons take them off or cover with an overall.
- Always make sure there are enough people to carry objects and never attempt to lift objects that are too heavy. Consider attending manual handling training for advice on how to lift heavy and awkward objects safely.
- In some cases specialist equipment is required, like pallet trucks, scissor or genie lifts and these should only be used by trained staff.
- Never try to carry something in a rush or over strain yourself to save time or because people are busy.
- Pad corners or sharp protrusions on the objects before you start moving it. Make sure the padding is securely attached so that it cannot slip off.

## ***Use Common Sense***

- Do not eat or drink in object handling or storage areas.
- Know the condition of an object before moving it. Identify the strongest part and hold at this point.
- Always use both hands to carry objects.
- Use a trolley, or pack objects into a box especially when many objects need to be moved, or carried over any distance. Objects may be heavier than they look.
- Check the bases of boxes/trays before lifting them as some boxes may not be robust enough to carry the object in.
- If you have to carry objects, only carry one object at a time. Even if the objects are small, do not be tempted to stack objects.
- Objects with more than one part, for example, a teapot and lid, handle each separately or stabilize loose components that cannot be removed.
- Always set objects down away from the edge of a shelf or table surface.
- Always lower an object gently to avoid chipping the bottom or corners. Make sure the object is stable and cannot topple before you leave it.
- Never leave objects in a position where other people may fall or trip over them.
- Try to avoid vibration when moving objects (For example; avoid pushing trolleys over uneven surfaces) as even small vibrations could cause micro-cracking in some objects and eventually result in a breakage.
- For all objects try to reduce, as far as is practicable, the number of times they need to be handled and moved.

## ***Gloves***

It is recommended that Nitrile Gloves are worn when handling almost every type of object.

Gloves protect the objects from sweat and dirt on people's hands, but also protect the person handling the object from any toxic residues on the objects. Many objects may have come into contact with toxic substances during their lifetime, either through use, storage or through treatments for insect pest infestation (e.g. mercury and arsenic). There is usually no record of which objects have been treated in this way so gloves should always be worn as a precaution to protect the wearer.

Make sure the gloves that you wear are well fitting, and powder free. Do not use latex gloves if you suffer from allergies.

Heavy duty work gloves will be needed when lifting heavy objects.

Change gloves frequently as they will get dirty and the dirt could be passed onto other objects.

### ***Moving Larger / Heavy Objects***

Manual lifting and handling carry a risk of personal injury. To reduce the risk keep all manual handling to a minimum and use trolleys, trucks and lifts wherever possible. PPE, such as steel toe boots, should also be used wherever possible.

The Manual Handling regulations set a maximum load of 25kg for loads at elbow height carried by a man. The equivalent figure for women is 16.7kg. However reduce these loads by 5kg when carrying in any other position and by 10kg when objects are being carried below elbow height.

Do not try and carry/lift anything that you are not 100% comfortable with. Take time to find and use the right equipment for the job for both the safety of yourself and the object.

### ***Health and Safety***

There are many items in museum collections that can contain hazardous materials. Ensure you are aware of any potential hazards present before you begin work with objects. If anything unexpected is found, seek specialist guidance.

## **2. Object specific guidelines**

### ***Furniture and wood***

- Assess the object and lift by its strongest point.
- Watch out for splintered or protruding surfaces when handling wood.
- All furniture should be handled and moved as little as possible. The most damage happens to furniture during movement and handling.
- Do not use handles or fixtures on furniture or objects to handle or move as they may not be strong enough.
- Wear clean white cotton gloves or disposable nitrile gloves when handling furniture and wooden objects. Oils, sweat and dirt on hands can damage varnished or waxed surfaces.

- Moving furniture usually requires at least two people even for small items. Always make sure there are enough people available before starting.
- Furniture and wood objects may have well-disguised old repairs or be worm eaten. Such parts may be particularly weak and will require extra care. Pieces of furniture which look substantial may have weak parts that are not obvious.
- Furniture is often heavy so take care when lifting. Keep your back straight and bend your knees before lifting the object. Straps can be used to lift larger pieces. Be careful when putting an object down not to trap fingers or toes.
- It is necessary to lift objects directly off the floor without tipping them back, lift squarely and evenly when moving, even when they are fitted with castors, rather than dragging them, which causes massive strain on the legs of the object, possibly even breaking them.
- Always make sure space at the new location is clear and free and ensure the route is clear.
- Whenever possible separate the piece into its component parts and move them separately e.g. remove drawers, tops, and mirrors. Check drawers and doors are empty. Shut doors firmly and tie them if necessary so that they cannot swing open. Number drawers if they are removed and line them up carefully when replacing them as it is easy to knock off veneers round the edges of the drawers when pushing them in again.
- Pad corners and veneers before moving.
- Always pick up the furniture by the lowest load bearing part. Never pick up chairs by the arms or pick up a piece by the top as this will put strain on and loosen the joints.

### ***Pictures and Mirrors***

- Wear clean white cotton gloves or disposable nitrile gloves when handling frames or framed objects. The only exception is when a painting or mirror is so heavy that you would be unable to get a secure grip while wearing gloves.
- Always check the structure of a framed work to ensure that it is robust enough to be moved. Check the surface of the frame for any loose decorative areas.
- Never pick up a frame or mirror by the top of the frame. Hold it by both sides; otherwise the top corners of the frame will be weakened. If the painting is small and light enough to be carried by one person, it should be lifted with the surface towards them.
- Pad the corners and bottom of the frame to prevent chipping and scratching the frame.
- Two people will be needed for large pictures or mirrors. Hold large frames by the side and bottom to support them. Frames are easily damaged when they are put down so do this with care. Very large paintings will need specialist movers.
- Carry pictures and mirrors vertically, not horizontally. Large pieces of glass or canvas can snap or distort under their own weight if they are laid flat without support.

- Never pick up a picture by using the stretchers on the back of the canvas this may stretch and distort the canvas and may cause the paint to flake.
- Never touch the picture within the frame
- Never touch the back of mirror glass or place any item against the silver as it is easily damaged.
- When standing a picture or mirror upright stand on foam blocks and make sure it cannot slip backwards or fall forwards.
- Never lean one picture or mirror directly against another. If frames must touch put protection between them to prevent scratching. It is particularly important with unglazed pictures not to lean anything against them. The canvas may be easily damaged.
- If pictures must be stacked, stack face to face or back to back. Always watch out for picture hooks, screws, eyelets or mirror back plates on the back of the picture or mirror. These must never come into contact with another picture or mirror as they can easily cause tears and scratches.
- When packing pictures for transport always put strips of masking tape or low-tack glass tape across the glass. If it breaks in transit the glass should remain in place reducing the risk of the paper or canvas being cut.
- Perspex or safety glass should not be taped but protected with a layer of tissue as it is easily scratched. Never cover Perspex in bubble wrap without an intervening layer of tissue
- Pack glazed pictures vertically in crates to reduce the risk of glass breaking

### **Health & Safety Warning**

The silvering on mirrors up until 1900 is a tin-mercury amalgam. Mercury vapour is toxic and it is possible that corrosion of the amalgam can release liquid mercury. Therefore wear gloves for handling and treat all dust residues as poisonous mercury residue. Do not use a vacuum cleaner to remove mercury dust as this will simply vaporise mercury back into the room. Consult the Health and Safety officer for further advice if this situation arises. Wash hands carefully and dispose of gloves after handling mirrors.

### ***Unframed works on paper***

- Always ensure your hands are thoroughly clean or wear clean cotton or nitrile gloves. Oils, sweat, acids and dirt on the hands can leave permanent damage to paper objects.
- Make sure that you do not touch the image, as pencil, chalk and other mediums can be easily smudged or damaged.
- Try not to pick up a print, drawing or letter by the edges or corners. If paper has to be picked up directly then support it using diagonal corners.

- Where paper is torn or very fragile, support the paper from underneath with card or stiff paper which is slightly bigger than the item. A card support is essential if the image or writing is on both sides of the paper or if the object is to be moved.
- Use only acid free mounts or envelopes or archival quality polyester sleeves for storage. Take extra care when putting paper items into or taking them out of such envelopes or sleeves. It is easy to crease or bend the paper or damage the corners. The easiest way to handle paper items is often to slide a piece of card under the object and slide it into or out of the sleeve on the card which can then be removed. Transparent polyester sleeves have the advantage that the object can often be viewed without the removal of the sleeve. However, paper objects that have friable media (chalk/pastel etc.) should not be inserted into polyester sleeves as the static will cause the media to lift.
- Every time folded or rolled paper is opened or closed its strength is reduced, and therefore re-rolling should be limited as much as possible. If there is any doubt as the fragility or brittleness of the paper a conservator should be consulted prior to unrolling.
- Use acid free boxes for storage and acid free mounts and framing materials
- When packing unframed paper items for transport make sure they are supported to prevent bending or creasing (e.g. wrap sleeve in paper and tape to a piece of card). In groups of papers are boxed together for storage or transport pack them so that they cannot crease or bend each other, interlocking sheets of card if necessary for extra protection.
- Where sticky tape of any kind is used on the outer packing of paper objects make sure that it cannot in any way come into contact with the paper object. When unwrapping the package, remove all the tape completely before exposing the object to avoid risk of accidental damage. If tape does come into contact with an object do not attempt to remove it yourself – contact a paper conservator.

### ***Photographs and negatives***

- It is essential to wear gloves when handling photographs. Oils, sweat, acids and dirt on the hands can leave permanent damage to photographic objects.
- Ensure hands are clean and wear clean cotton or nitrile gloves. Even when wearing gloves, avoid touching the image as much as practicable.
- It is preferable for photographs to be stored in enclosures and photographs should only be moved from these if unavoidable. Never allow your fingers to touch the surface of the photograph or negative; hold them by the edges only with your fingers at right-angles to the print or negative. Whenever possible place the photograph on a sheet of stiff paper or card so that you can pick up the card to move or examine the object without directly handling the photograph.
- Use only acid free mounts or envelopes or archival quality polyester sleeves for storage. Take care when putting photographs into or taking them out of such envelopes or sleeves. It is easy to crease or bend the photograph or damage the corners. The easiest way to handle is often to slide a piece of card under the object and slide it into or out of the sleeve on the card which can then be removed. Transparent polyester sleeves have the advantage that the object can often be viewed without the removal of the sleeve.

- Use acid free boxes for storage.
- Interleave photographs in albums with photo-safe storage paper so that the surface of the photo cannot touch another photo or a blank page that may not be acid free.
- When packing unframed photographs for transport make sure that they are supported to prevent bending or creasing. If groups of photographs are boxed together for storage or transport pack them so that they cannot crease or bend each other, interlocking sheets of card if necessary for extra protection.
- Where sticky tape of any kind is used on the outer packing of photographs make sure that it cannot in any way come into contact with the paper object. When unwrapping the package, remove all the tape completely before exposing the object to avoid risk of accidental damage. If tape does come into contact with an object do not attempt to remove it yourself – contact a paper conservator.

### **Textiles**

- Handle textiles as little as possible.
- All parts of a textile need to be fully supported and no part should be left trailing. A costume or textile may be a lot heavier than it looks so never attempt to move an object that is too heavy or large.
- Always ensure your hands are clean and dry. Or wear Nitrile gloves, especially if there may be metal threads or accessories within the textile. Never wear jewellery on your hands and wrists that might catch in the weave of the textile.
- Objects should be placed in trays or boxes, or placed on a support board wherever possible when moving.
- Use only acid free storage materials.
- Never leave textiles uncovered. Place if possible in boxes with lids and/or cover top layer with acid free tissue.
- When handling assess for pests and pest damage.
- All old fabric will be weaker than its modern counterpart. Old fibres lose their elasticity and become brittle; this means that they can snap easily and regardless of appearance all old textiles should be handled as if their condition is fragile. If in any doubt contact a textile conservator before attempting to move the object.
- Textiles are easily torn or pulled out of shape. Support large textiles from underneath e.g. by laying them on a sheet of calico or melinex. In the case of very fragile textiles do not turn them over directly without the aid and advice of a textile conservator. If very large textiles are to be moved they should be rolled up and carried on a roll, rather than folded to ensure the least possible strain on the fibres. Use as large a diameter roller as possible and pad it to take any unevenness in the textile. Interleave the roll with acid free tissue.
- Extra care should be taken with fastenings, particularly hooks and eyes and with any attached decoration such as beading or sequins. Isolate any corroded metal fasteners with acid free tissue.



- Folds should be avoided as they put strain on the fibres and will be the point where fibres first snap. If an item has to be doubled over pad the fold with acid free tissue to make a roll rather than a sharp crease. For all costume items pad areas like sleeves, shoulders and busts to try and keep the shape and provide support at the same time. Interleave all layers of a garment with acid-free tissue.
- Whatever the textile try to minimise friction and minimise the weight resting on weak points by careful use of padding and supports.
- If layering textile in boxes or drawers place heavier items on the bottom and lighter on top.
- Sticky tape is very damaging to all textiles and can leave irremovable stains. Try not to use it near textiles but if the outer packaging has to be sealed with tape make sure that it cannot get anywhere near the textile if the packaging gets torn. Remove sticky tape completely when undoing a taped textile package. If tape does come into contact with an object do not attempt to remove it yourself contact a textile conservator.
- Use stitched or tie-on labels for all textiles. Pens and markers should not be used near textiles. If taking notes use only a soft graphite pencil.
- Textiles are often part of other objects e.g. chair covers and are often the weakest part of the object. This often means it is necessary to take extra care. For example when moving an upholstered chair, do not touch the seat cover but lift by the legs instead.

## **Metals**

Gold, Silver, Copper, Bronze, Brass, Iron, Lead, Pewter, Tin etc.

- Wear nitrile gloves for handling metals as skin acids can mark the surface and will promote rapid tarnishing. Stainless steel is an exception where cotton gloves should be worn to avoid leaving tacky finger marks on surfaces.
- Keep separate pairs of gloves for different metals e.g. silver, iron, copper and its alloys, because microscopic particles can be transferred from one metal to the other and will increase the tarnishing rate.
- Metal objects can be very heavy. Assess before you handle.
- Metals are easily scratched. Make sure that you are not wearing jewellery or sharp belts, buttons or watchstraps.
- Be aware of metal corrosion on surfaces.
- Always use both hands to pick up a large object, holding it firmly at the base and round the middle. Never pick up a bowl by the rim. Soldered joints are often weak and should be handled with care, especially knobs, handles etc.
- Always check whether lids are fixed or loose before moving and whether the object can be dismantled into several pieces. If lids are loose or if the object is in several parts, dismantle it and treat each part as a separate item. Even if the lid is attached, always support it when turning the piece upside down.

- Lead is very soft and easily damaged. Thin silver, copper and bronze items may be fragile and easily bent or dented by rough handling. Cover the work table with a sheet of supportive material such as plastazote or similar padding to avoid accidental damage.

### **Ceramics**

- Ceramics are easily broken so extra care should be taken when moving pieces.
- Old glue repairs may be points of weakness. Ceramics may have been repaired 'invisibly' in the past, but there may still be points of damage or hairline cracks that are points of weakness.
- Do not be tempted to handle ceramics without gloves. If the surface is porous or there are unglazed edges (e.g. unglazed earthenware or biscuit ware), staining can be caused by sweat and dirt on hands.
- Check whether a lid is fixed or loose. If loose take it off and treat it as a separate item. Even if the lid is attached always support it when turning the piece upside down. Never pick up a lid by the knob or the handle.
- Always be careful of outstanding and protruding decoration as this may be easily chipped. Wrap and cushion ceramics well in particular, handles, spouts or rims before padding the whole object.
- Cover worktables in a supportive material such as a thin layer of Plastazote. Lower ceramics gently onto work surfaces and shelves to avoid chipping the bases.
- Always use both hands to pick up china and pottery and cradle the piece carefully. Never pick up two pieces of ceramic at once.
- Never pick up a jug or cup by the handle as there is a possibility that the join will break. Never pick up a plate or bowl by the rim; it may snap under its own weight. Support it underneath.
- Support ceramics carefully for transport. They can be cushioned with nests of acid free tissues so that they cannot move in any direction within the box or crate. Ensure there is sufficient padding on all sides and sufficient space between objects in containers.
- If an accident should happen never try to fit the pieces together – more damage can be caused as the edges grate together. If possible take a photograph of the broken item, and the pieces where they land on the floor. Cordon off the area and contact a conservator as soon as possible. If a conservator is not available and it is necessary to clear the area pick each piece up and wrap separately in tissue.
- Once all the large pieces have been collected sweep the whole area and collect even the tiniest fragments.

### **Glass**

- Wear nitrile gloves to improve grip and minimise fingerprints. Moisture, oils and acids from hands can disrupt delicate surfaces.

- The biggest risk to glass is breakage. Handle glass as little as possible. Always take extra care when moving pieces of glass to ensure that your route is clear and your destination uncluttered.
- Cover work tables with a supportive material such as a thin layer of Plastazote. Use cushioned supports to minimise movement when carrying. Lower glass objects gently onto work surfaces and shelves to avoid chipping the bases. Place the glassware in the centre of the table or shelf.
- Crizzled glass will shatter with only a light tap, so be extra careful when setting down on a surface.
- Clouded or iridescent glass will lose its surface easily if handled carelessly or too often.
- Check whether a lid is fixed or loose. If loose take it off and treat it as a separate item. Even if the lid is attached always support it when turning the piece upside down. Never pick up a lid by the knob or the handle.
- Be aware of previous repairs. Old glue repairs may be points of weakness. Glassware may have been repaired 'invisibly' in the past, but there may still be points of damage or hairline cracks that are points of weakness.
- Always be careful of outstanding and protruding decoration as this may be easily chipped. Ensure sufficient space around each object. Do not allow objects to knock together.
- Always use both hands to pick up glassware and cradle the piece carefully. Never pick up two pieces of glassware at once.
- Never pick objects by their handles as there is a possibility that the join will break. Never pick up a plate or bowl by the rim; it may snap under its own weight. Support it underneath.
- Never apply tape or sticky labels to glass or ceramic objects.
- Carry large sheets of glass vertically like that suggested for pictures and mirrors as they may snap under their own weight if laid horizontally.
- Be aware that some glass items may contain liquids and specimens take extra care when packing and moving these items.

### ***Stone artefacts and rock and mineral specimens***

- Wear nitrile gloves when handling.
- Be aware of past repairs and poor surface and structural conditions. Assess before you handle.
- Some stone objects can be deceptively heavy and have weak points not always obvious. Lifting and handling can cause damage to the handler as well as the object. Large pieces of stone will always need several people to carry them and may need specialised equipment, such as a forklift, or pallet truck. Never try to move a piece of heavy stone with insufficient personnel and equipment.

- Porous stone such as marble, alabaster, plaster and terracotta have softer surfaces than non-porous stones such as granite, porphyry and jade but both are susceptible to abrasion and bruising.
- Smaller stone artefacts and rock and mineral specimens should be treated like ceramics or glass. Take extra care when moving pieces to ensure that your route is clear and your destination uncluttered. Always use both hands to pick up even small stone objects and cradle them carefully.
- Be aware of component parts and treat separately e.g.a bust on a stand.
- A conservator or specialist large object mover should be asked for advice when moving large and heavy stone items. Use straps to help lift large objects and make sure that the straps are securely positioned and cannot slip. Pad the points where the straps will make contact to avoid rubbing or chipping the stone. Such padding must be securely tied to ensure that it cannot slip.
- Because the weight makes it hard to control, stone is most at risk when being set down. Make sure there is plenty of padding in place before you move to avoid chipping corners.
- Take care when picking up and placing down objects not to tilt them. Placing too much weight on object edges may cause chipping especially with plaster which are much lighter than stone.
- Carry marble tops of other large stone slabs vertically; they may break under their own weight. Raise them vertically, then lift and carry them vertically.

### ***Bone, Horn, Antler and Ivory***

- These materials are particularly susceptible to changes in relative humidity and temperature and easily damaged by handling. Porous bone and ivory material can be very thin and fragile.
- Wear nitrile gloves to prevent finger marks, sweat deposition and localised changes in relative humidity (heat and moisture from the hands are sufficient to warp thin ivory).
- Ivory is most sensitive to changes in RH and horn is the least sensitive. Ivory is a hygroscopic material. It absorbs or releases moisture with changing humidity, swelling or shrinking in response to variations in moisture content. Fluctuations in RH can cause cracking and warping.
- Handle with care. Always be careful of protruding decoration as it is easily chipped. Work on a padded surface.
- Ivory is easily stained and must not be left in contact with iron, copper, brass or coloured materials.

### ***Leather***

- Thin and brittle leather can be damaged if handled without care. It may have a soft surface which can be easily scratched.

- Always handle leather wearing nitrile gloves. Leather is particularly susceptible to mould and your hands will provide the micro-organisms to initiate mould growth.
- Always be careful of decoration on leather. Never touch gilding on leather as the gilding may come off.
- Leather can be easily deformed or broken. Do not lift objects such as suitcases by the handles, instead lift from underneath with two hands. If leather has lost its flexibility do not be tempted to try and bend it back into shape. Consult a conservator for advice.
- Never pack books tightly as this may damage the spines.
- When taking books off shelves, never put your finger over the top of the spine and pull; you may break the spine and the headband. If there is space, put your hand right in and push the book out from behind. If there is no space, push two of the books on either side of the book you want, further into the shelf and then grip the book lightly between thumb and fingers around its spine and draw out. Always grip the book firmly with your fingers completely around the spine.
- Always be carefully with books that have metal clasps. Protect them from rubbing against other books or objects.

### 3. Notes on Specific Collections

#### ***Large and Industrial Objects***

These collections can be heavy, unwieldy and awkward to manipulate and manoeuvre. Even where an object was designed to be mobile it can now be too old or fragile to be moved under its own power or supported by its own wheels.

Specialist help is usually essential and always consult a conservator prior to moving larger objects. Specialist haulage contractors may also be required and should work closely with museum staff when planning and throughout the move. It is particularly important to plan each stage of any move in advance, ensuring that routes are not only clear, but also have sufficient load and weight clearance. Choose a route that puts least stress on the objects.

#### ***Lacquer and Japanning***

It is essential to wear clean gloves when handling lacquered or japanned surfaces as fingers will leave marks. Remove jewellery to avoid scratching the surfaces.

To avoid snagging, dislodging or crushing loose areas, check for any areas where the surface may be lifting, before handling.

Avoid touching or holding any decoration or raised areas and do not lift an object by the handles.

#### ***World Culture collections***

In general handle collections as appropriate for the materials that they are made from. Be particularly aware that ethnographic collections may be made from many different materials

and are often complex, fragile objects. They may have many joints, fragile surface coatings, be made from many loose elements such as beads and feathers or be held together with old adhesives. The collections should be handled as little as possible and always inspect an object first to identify any areas of weakness. Avoid directly touching surface coatings, painted areas, as pigments are often loosely bound and friable. Ideally objects should be moved in trays, or boxes. Small objects can be supported with two hands.

Always wear disposable nitrile gloves when handling ethnographic collections. Some objects may be contaminated from their past use (e.g. poisons on spears) or may have been contaminated by remnant insecticide treatments (such as arsenic or mercury salts). Chain mail gloves can be worn if sharp weapons such as swords are being moved.

### ***Musical Instruments***

Handle musical instruments as recommended for the materials that they are made from (for wood see furniture or metal sections). Be aware that instruments may have many protruding features, such as the neck and keys on a stringed instrument. Never hold an object by any projecting features. Ideally cradle the instruments in two hands.

Small mechanical parts may be particularly fragile. Some instruments are made up of several parts and may have loose joints, or moving parts, for example woodwind or brass instruments. Historic keyboard instruments may be separate from their stands.

The older an instrument is the greater the likelihood that different parts no longer fit together, and they may come apart unexpectedly. Inspect an object thoroughly before picking it up to identify any weaknesses.

### ***Scientific Instruments***

To prevent damage to polished metal or other vulnerable surfaces always wear gloves when handling these objects.

There may be particular health and safety issues related to scientific instruments, for example with thermometers, barometers or other instruments containing mercury. These items should be moved by specially trained members of staff.

Remove any gold or silver jewellery that you may be wearing as this can pick up mercury vapour. Wear vinyl gloves and take special precautions to prevent mercury spillages. Always have a mercury spillage kit to hand if you are planning to move objects that may contain mercury. If there is any chance that dust on the object may be contaminated with mercury, a mercury mask should be worn.

Before moving an instrument, such as a balance or galvanometer, check that any locking mechanism is engaged. Ensure all catches and doors are closed. Many instruments and clocks will need to be dismantled before they can be safely moved (i.e. the clock mechanism should be removed from the clock casing before travel). This should be done by a trained conservator and should not be attempted unless specially trained.

Barometers should generally be transported inside bags at 45 degrees and never laid flat. NMS has a number of barometer transport jigs for this purpose. The barometer should be tilted gently to avoid the mercury breaking the top of the tube.

## ***Natural Science Specimens***

The general guidance notes should be followed when handling Natural Science Specimens, however there are particular Health and Safety issues that need to be considered when handling these specimens.

The requirements of the Control of Substances Hazardous to Health Regulations 1988 must be complied with when handling any specimens, and the use of hazardous substances in their preparation and preservation. Some organisms contain toxins that will be present in fresh specimens, but may also survive in preserved specimens. Recently dead specimens may also be particularly hazardous and can transfer disease.

Natural Science specimens should only be handled once all the potential hazards have been identified.

When handling any taxidermy specimens, disposable nitrile gloves should always be worn as they may have historically been treated in the past with chemicals such as arsenic or mercury salts.

Specimens preserved in alcohol can present a fire hazard and it is essential to keep these away from any sources of ignition. Always have a spills kit to hand if you are moving wet specimens.

## ***Geological Specimens***

Geological specimens may be very heavy so follow guidelines for large heavy objects where appropriate. It is advisable to wear disposable gloves when handling geological specimens as these may also contain unknown elements that are potentially hazardous to health.

## ***Archaeological collections***

All archaeological collections should be handled wearing impermeable gloves (such as nitrile or vinyl). Archaeological objects are also more likely to have been treated with chemicals to make them stable (for example benzotriazole is commonly used to stabilise copper alloy objects and this chemical is toxic). Therefore it is important to wear gloves to protect yourself from potential hazards.

In general handle objects according to their material type. Each object should be carefully examined before being lifted as weak areas may not always be apparent. Depending on the extent of corrosion, metal objects may be heavier than anticipated or in some cases, lighter than anticipated. Some objects may appear intact on the surface but the interior of the object may be hollow. Burial conditions may have rendered the objects much weaker than an equivalent historical object. .

Waterlogged organics are particularly prone to marking when handled. Be particularly cautious about putting pressure on these surfaces when handling.

## ***Plastics***

Plastics should always be handled with gloves. As well as protecting objects from sweat, dirt and grease on the hands, it is possible that plastics contain plasticizers that are potentially harmful. Unless, a plastic can definitely be identified as being of a stable composition (i.e. polythene) there is a possibility that degradation products may form on the surface of the plastics that are toxic.

Plastic objects may be more brittle than they first appear; particularly older plastics that have aged, so be aware that these objects can be very fragile and may shatter if bumped against a surface.

## 4. Packing

### *Packing Museum Objects*

Packing provides the defence between objects and the dangers that surround them. The packing method depends upon several factors as outlined below.

Museum objects can be damaged by insufficient or inappropriate packing materials. This can result in long term damage to the object including physical and/or chemical damage or expose objects to environmental factors including pests and unstable temperatures and RH.

In some circumstances, object surfaces may be so delicate that minimal or no packing material should come in to contact with them at all. In these cases consult a conservator.

Good packing should provide protection from dust, dirt, environmental changes, vibrations and surface abrasion as well as providing support and stability to the object. In order to decide which packing method and materials to use, assess every object individually. Even similar objects can require different packing solutions.

The following should be considered:

- **The material the object is made of?**
- **The condition of the object?** How stable is the object?  
Does it require extra support?  
Does it have evidence of previous damage?
- **The size of the object?** Is it too big to pack or very small it may get lost in packaging?
- **The shape of the object?** Is it practical to be placed in a box?  
Will there be wasted space?
- **The weight of the object?** Is it too heavy for a box?  
Does it require a warning label?
- **The environment of which the object it is to be kept?** Roller or static racking?  
Pack to minimise vibration
- **How long will the object remain in the packing?** Packing for short or long term

## 5. Packing Materials

It is important we always use inert, chemically stable packing resources. Therefore we can be sure no chemical reactions will take place between the object and the packing material over time. The materials should always be suitable for the object you are packing and be cost effective and flexible, whereby they can have multiple uses in different packing solutions.



Packing for short or long term should be considered. Using materials such as bubble wrap are ideal for providing temporary support and protection for transportation but as a long term packing material not ideal.

### **Acid-free tissue**

Used as a protective layer in between non archival materials such as between the object and bubble wrap, shelving or polyethylene trays and boxes.

Acid-free tissue can be made into soft pads, tubes and nests to provide cushioning for objects. Single or multiple sheets can be used at a time to produce tissue pads of various densities.

Used as a buffer around objects to provide support and protection when packing objects including ceramics, glass and padding out folds when textile packing.

### **Plastazote / Stainless steel pins / Correx**

A stable, safe and non-reactive polyethylene foam. Smooth in surface and available in sheets and blocks of various densities. Can be cut easily with a stanley knife to custom shapes and sizes and used to line containers, crates and shelving. Plastazote is a good shock absorber providing cushioning against vibration and grip for objects on shelving.

Plastazote liners can be used in conjunction with correx sheets and stainless steel pins to pack objects. Objects can be stabilised using pins pushed through custom cut plastazote blocks or strips and into a rigid layer of correx to hold the blocks in place. Objects can be pinned around the edges or cradled underneath using plastazote to provide support and protection in containers.

### **Jiffy Foam**

A flexible polyethylene sheet available in various densities. Used as interleaving between objects, padding pointed edges on artefacts and corners on framed or flat art. Resilient to bending and has to be taped or tied to hold its shape.

Ideal for short term packing but not long term storage whereby Jiffy foam when sealed can prevent air movement and create microclimates within the packaging causing damage to the object inside.

### **Bubble Wrap**

Used to 'softwrap' large objects and provide cushioning, shock absorption and padding sharp object edges. A good short term packing material for transportation but not ideal for long term storage because sealed bubble wrap can prevent air movement and can create microclimates within the packaging causing damage to the object inside.

At least a double layer of bubble wrap should be used when packing. Bubbles should face away from the object when packing and should not be used directly against any object for risk of a bubble imprint transferring onto object surfaces. Use in conjunction with an acid-free tissue layer.

### **Tyvek**

A lightweight, breathable and inert fabric which can be stitched or glued together. Tyvek is resistant to tearing, dust particles and water and ideal for protecting paintings, rolled textiles, costume, furniture and large artefacts. Protective covers can be made to fit. Tyvek labels are water resistant and durable and can be tied to objects with cotton tape.

Tyvek is ideal for making cushions which provide a smooth soft surface against the object while stabilising movement in transit. Tyvek can be washed and re-used.

One side of the Tyvek is soft and fluffy, the other smooth and shiny. Always pack with the soft fluffy side toward the object.

### **Melinex / Mylar Sleeves**

A transparent, colourless and inert plastic available in various thicknesses. Used to make envelopes and sleeves for paper artefacts and photographs. Can be glued to acid-free board to provide a flat protective cover for transport and storage.

**Other suitable materials:** cotton tape, polyethylene trays and boxes (bread trays / euroboxes), acid-free card and boxes.

### **Materials not to use:**

- Non Acid-free materials (newspaper, cardboard, regular tissue paper)
- Sellotape
- Blue tack
- Cotton Wool
- Polystyrene beads
- Bubble wrap and plastic in direct contact with the object
- Any materials of unknown origin

## **6. General Packing Guidelines**

Before packing an object read through the following guidelines in conjunction with object handling guidelines specific to the object you are dealing with in order to apply best practice. Packing involves initial individual assessment and using your own judgement about the best method and materials to apply for object support and protection.

- Choose packing containers big enough to fit and sustain the weight of the object as well as provide enough room for sufficient packing material around the object.
- Use inert / acid free packing resources.
- Ensure the packing resources and methods are suitable for the object/s you are packing.
- Ensure you have a suitable area to undertake packing and pad table surfaces.
- Pack fragile objects separately.
- If layering, pack heavy objects at the bottom of containers and lighter items on top.
- Pack objects of similar material and composition together.
- Objects with multiple parts should be packed separately i.e. teapot and lid.
- Ensure every part of the object is well supported and protected.
- Ensure containers are clearly labelled with the contents and any risks present e.g. fragile items, heavy items, poisonous material, uneven weight distribution. Photographs of the object can be taken and placed on the front of the box in storage to minimise future disturbance.
- Clearly label containers not to be stacked on top of.
- Do not over pack containers. Objects should be identifiable without being removed from packaging.
- Do not pack small objects excessively in tissue as damage can be sustained during unpacking or mistaken for empty packing and disposed of in error.
- Fill in space voids within containers to prevent objects moving during transit.
- If reusing packing material ensure material is clean and pest free.
- Pack textiles and costume to minimise folds and creases.
- Keep pens away from object areas to avoid accidental marking. Use pencils only when dealing with paper and textile artefacts.
- Inventory the objects as they are being packed and label each item if possible. Do not stick labels to objects. Tie Tyvek labels to objects or pin labels next to objects where possible.

- If layering objects in trays or boxes highlight which objects are on which layer on the outside of the box or inventory sheet to enable easy accessibility for future handlers and minimise over handling.

This guidance has been coordinated by the Collections Services Department at National Museums Scotland.

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