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U DUBROVNIKU
UNIVERSITY
OF DUBROVNIK

ENGLISH FOR CONSERVATION AND RESTORATION **1**

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2023.

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GENERAL PRECAUTIONS FOR STORAGE AREAS – CCI NOTES 1/1¹

General Precautions for Storage Areas – Canadian Conservation Institute (CCI) Notes 1/1

Introduction

Most museums are able to display only a small percentage of their holdings, so many artifacts must spend the majority of their museum lives in storage. These objects in storage are just as important as those on display, and require the same quality of long-term protection. Well-designed storage facilities that are regularly maintained are therefore of primary importance. This Note is a basic introduction to this complex subject, and includes reading lists at the end of each section for further study.

The Storage Area

Location

Collection storage areas are best located away from public areas. They should be in the centre of the building away from exterior walls, and have no narrow corridors, sharply angled access ways, stairs, or narrow doors (the better the access, the less the potential for neglect). Basements and attics are usually not appropriate due to temperature fluctuations, extremes of relative humidity (RH), and potential leaks or floods. Water damage is a threat to storage areas in any location in a museum or gallery. Water or steam pipes are a hazard due to potential leaks and condensation, so locate storage areas away from pipes or, if this is not possible, inspect the pipes regularly. If there is any risk of flooding, locate storage areas above the flood plain; install water detectors and sump pumps if necessary. As a further precaution, store objects off the floor on shelves, platforms, or blocks, and cover them loosely with plastic sheeting. Store artifacts in a different location than non-collection items (e.g. display props, packing boxes or materials, paint, tools, and other supplies) if possible. Keep a separate storage location for new artifacts and other materials entering the museum. In this temporary holding area the objects can acclimatize slowly to the museum's environment before being unpacked and inspected. Objects with insect infestations or mould growth can be isolated in this area, thus preventing spread through the rest of the museum.

¹ Canadian Conservation Institute (CCI) (2002) General Precautions for Storage Areas 1/1, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/precautions-storage-areas.html>. Pristupljeno 21. ožujka 2022.

Storage units

Different categories of objects require different storage methods, e.g. screens, racks, metal or wood shelving, metal or wood cabinets, drawing cabinets, platforms, and rolled storage. The choice of method and material depends on the resources available to the institution and on the type of artifact being stored. Whatever kind of unit is chosen, it should be made of materials that are chemically inert and have good long-term stability. The same rules apply to wrapping, padding, and support materials. Paints or other finishes used on storage systems should also be of proven stability.

Procedures

For seasonal museums that are closed or unheated during the winter, drain pipes in the fall to prevent freezing. Inspect roofs, uninsulated walls, overhead pipes, and other fittings regularly for signs of leakage or condensation. Prohibit smoking and the storage or consumption of food and beverages in storage areas, and post appropriate signs. Keep collection storage rooms locked, with entry to the storage area and movement of objects into or out of storage controlled by authorized personnel. Ensure that work not related to the function of the storage room is done elsewhere (i.e. preparing exhibition furniture, framing works, packing artifacts for travel, and similar activities should not be carried out in a storage area). Use work stations within the storage only for tasks related to documentation and movement of the collection.

Systems

Environment

Environmental conditions in storage areas should be similar to those in display areas. Ensure that lighting has an intensity of 150 lux or less, and an ultraviolet content of no more than 75 $\mu\text{W}/\text{lm}$. Turn lights off when they are not needed. Eliminate external sources of daylight with drapes or blinds, or by boarding up the windows. Maintain temperature and RH at levels appropriate to the collections, and avoid extremes and excessive fluctuations. Monitor temperature and RH levels regularly. Ensure adequate air circulation to discourage mould growth and insect attack. Do not store objects near furnace pipes, radiators, or air vents. If possible, install dust control and air filtering systems. When planning a new storage area or redesigning an existing one, consult a conservator to determine the type of storage equipment needed, the proper use of space, and the most appropriate environmental conditions based on artifact requirements.

Safety and security

Prepare a disaster plan covering as many contingencies as possible, including flood, fire, break-in, and any possible natural agents in the locality of the museum.

Ensure that all staff are aware of their duties and responsibilities in the event of an emergency. Do not store flammable materials (e.g. solvents, paints, varnishes, waxes, etc.) in or near the collection storage rooms. Identify any fire hazards (e.g. trash, electrical fittings, etc.) and take steps to eliminate them. Inform the local fire service of any hazardous objects (e.g. firearms, ammunition, poisons, cellulose nitrate film, etc.) in the collection. Take steps to render this material as safe as possible, and record this information. Keep fire extinguishers (the dry chemical or CO₂ type will cause the least damage to a collection) ready for use near the entrance to each storage room, and train all museum staff in their operation. Equip rooms with an early-warning fire alarm system that includes an automatic extinguishing system. If a sprinkler system is installed, ensure that it is configured to minimize the amount of water discharged in the event of a fire. If possible, install security alarms or continuously monitor all museum facilities. Install locks on all facilities, and strictly control the location and number of keys. If the institution is located in an area subject to seismic activity or to vibration, take measures to secure the collections and protect them from falling debris.

Inspection and Maintenance

It is extremely important to carry out regular inspections to monitor the condition of objects and to identify potential problems before they occur. A clean, well organized storage area will facilitate easy access to the collection for inspection, and will minimize the potential for overlooking problems. Inspection routines can be broken down in a number of ways; daily, weekly, and longer-period inspections are perhaps the easiest for staff to put in place and maintain.

Daily inspection

Give the storage area a cursory inspection every day to pick up signs of trouble such as leaking pipes, condensation, etc. Check RH and temperature daily and record the values for future reference (recording hygrothermographs take the labour out of this task). If no controls are installed, or if systems are not working, move sensitive objects to a safer, more stable location during periods of excessive environmental fluctuations. It is not necessary to examine objects in detail unless there are known problems that need continual monitoring.

Weekly inspection

Check artifacts and storage units located in different parts of the storage area for signs of insect infestation. In addition, look for accumulated dust or debris, as such traces are an indication of problems. Dust is abrasive and it also reacts with moisture to accelerate chemical degradation, making it important to keep storage areas as clean as possible. If necessary, perform regular housekeeping procedures: vacuum the room and storage facilities (but not the artifacts); avoid cleaning compounds that may cause damage if

they come into contact with artifacts; instruct janitorial staff in safe methods of washing floors in the vicinity of artifacts. Briefly inspect the objects in the storage area to ensure that they are adequately covered, well supported, and in their proper locations.

Quarterly or semi-annual inspection

Inspect all objects in storage for signs of damage or other changes in condition (such information should become part of the documentation unique to each artifact). If any change in condition of objects is discovered, take whatever steps are necessary to prevent additional damage. Check all wood, leather, paper, textile, and other organic materials for evidence of infestation and mould growth, especially after hot, humid periods. Examine metals for signs of active corrosion. Inspect all mounts, padding, covering, and storage materials to ensure they are still doing their job. Examine and calibrate environmental monitoring equipment. Check light levels and inspect all electrical equipment. Assess pipes, ventilators, radiators, and other installations for proper function and signs of problems. Inspect all heating and ventilating, fire protection, and security systems, and perform any necessary maintenance.

Care of objects

Each class of objects in a museum collection requires care of a specific nature. It is important to discriminate between techniques used for the general care of objects, and techniques applied by specialists for restorative treatment and repair. Information on the basic care of a wide variety of artifact materials is dealt with in the CCI Notes series, some of which are referenced below. Treatment beyond that described is best left in the hands of a conservator.



1. Reading Comprehension

1.1 After reading the text *General precautions for storage areas*, answer the following questions.

1. Can all museum artifacts be displayed? What is done with those that are not put on display?
2. What is the best location for storage areas? Can you describe it?
3. What does the acronym RH stand for?
4. Why must new artifacts be kept separately in temporary holding areas for a while?
5. What kinds of materials should be used in storage units?
6. Describe some general storage procedures!
7. What environmental conditions are required in storage areas regarding light, RH, air circulation etc.?

8. What should be included in the disaster plan for the museum?
9. What type of fire extinguisher causes the least damage to a collection?
10. How often should inspections to monitor the condition of objects be carried out? Name some of the inspection routines!

1.2 Fill in the blanks with the missing words.

Missing words: *temporary, fluctuations, mould, narrow, collection, floods, acclimatize, shelves, hazard, exterior, attics, storage, access, threat, pumps, away, condensation, precaution*

1) _____ storage areas are best located 2) _____ from public areas. They should be in the centre of the building away from 3) _____ walls, and have no 4) _____ corridors, sharply angled access ways, stairs, or narrow doors (the better the 5) _____, the less the potential for neglect). Basements and 6) _____ are usually not appropriate due to temperature 7) _____, extremes of relative humidity (RH), and potential leaks or 8) _____. Water damage is a 9) _____ to storage areas in any location in a museum or gallery. Water or steam pipes are a 10) _____ due to potential leaks and 11) _____, so locate storage areas away from pipes or, if this is not possible, inspect the pipes regularly. If there is any risk of flooding, locate storage areas above the flood plain; install water detectors and sump 12) _____ if necessary. As a further 13) _____, store objects off the floor on 14) _____, platforms, or blocks, and cover them loosely with plastic sheeting. Store artifacts in a different location than non-collection items (e.g. display props, packing boxes or materials, paint, tools, and other supplies) if possible. Keep a separate 15) _____ location for new artifacts and other materials entering the museum. In this 16) _____ holding area the objects can 17) _____ slowly to the museum's environment before being unpacked and inspected. Objects with insect infestations or 18) _____ growth can be isolated in this area, thus preventing spread through the rest of the museum.²

² Canadian Conservation Institute (CCI) (2002) General Precautions for Storage Areas 1/1, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/precautions-storage-areas.html>. Pristupljeno 25. ožujka 2022.

2. Vocabulary³

2.1 Match the words on the left with their synonyms or definitions on the right.







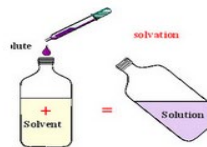
1) precaution	a) a man made object of historical value
2) museum artifact	b) a coating or discoloration caused by various fungi
3) fluctuation	c) substance, ordinarily a liquid, in which other materials dissolve to form a solution
4) to acclimatize	d) a measure of caution
5) mould	e) not able to affect other chemicals
6) inert	f) the pieces that are left after something has been destroyed
7) flammable	g) causing damage or wear by rubbing, grinding, or scraping
8) solvent	h) variation
9) debris	i) to adjust, to adapt
10) abrasive	j) capable of being set on fire
11) degradation	k) wearing away due to chemical reactions, mainly oxidation, mostly on metals
12) corrosion	l) the act or process of damaging or ruining something

3. Visual glossary⁴

rack	a framework, typically with rails, bars, hooks, or pegs, for holding or storing things.	
drapes	heavy curtains	
mould growth	Moist, warm conditions Grows easily on bread, cheese and soft fruits Grows throughout food to extract nutrients from it	

³ Merriam-Webster, <https://www.merriam-webster.com/>. Pristupljeno 26. ožujka 2022.

⁴ Quizlet Study Set: General Precautions for Storage Areas – CCI Notes, <https://quizlet.com/679702193/general-precautions-for-storage-areas-cci-notes-flash-cards/?funnelUUID=92c50847-7724-44e6-9340-1a25edb8fa91>. Pristupljeno 27. ožujka 2022.

insect infestation	insects to be present in a place in large numbers	
debris	scattered fragments, wreckage	
corrosion	the gradual wearing away of a metal element due to a chemical reaction	
flammable	able to catch fire easily	
degradation	a decline to a lower condition, quality, or level	
pipes	round, metal tubes that are used to transport water from one place to another.	
solvent	A liquid substance capable of dissolving other substances	



4. Grammar

4.1 Fill in the blanks with the missing modal verbs.

Should be made, are able to, should be in, should be similar, can, should also be, can be broken, can be

Most museums 1)_____ display only a small percentage of their holdings, so many artifacts must spend the majority of their museum lives in storage.

They 2)_____ the centre of the building away from exterior walls, and have no narrow corridors, sharply angled access ways, stairs, or narrow doors (the better the access, the less the potential for neglect).

In this temporary holding area the objects 3)_____ acclimatize slowly to the museum's environment before being unpacked and inspected.

Objects with insect infestations or mould growth 4)_____ isolated in this area, thus preventing spread through the rest of the museum.

Whatever kind of unit is chosen, it 5)_____ of materials that are chemically inert and have good long-term stability.

Paints or other finishes used on storage systems 6)_____ of proven stability.

Environmental conditions in storage areas 7)_____ to those in display areas.

Inspection routines 8)_____ down in a number of ways; daily, weekly, and longer-period inspections are perhaps the easiest for staff to put in place and maintain.⁵

4.2 Choose the correct answer to complete IF clauses of the 1st type.

1. *Water or steam pipes are a hazard due to potential leaks and condensation, so locate storage areas away from pipes or...*

- a) if this is not possible, inspect the pipes regularly.
- b) if this was not possible, inspect the pipes regularly.
- c) if this will not be possible, inspect the pipes regularly.

2. *locate storage areas above the flood plain; install water detectors and sump pumps if necessary.*

- a) If there was any risk of flooding,
- b) If there is any risk of flooding,
- c) If there would be any risk of flooding,

⁵ Canadian Conservation Institute (CCI) (2002) General Precautions for Storage Areas 1/1, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/precautions-storage-areas.html>. Pristupljeno 30. ožujka 2022.

3. ... *ensure that it is configured to minimize the amount of water discharged in the event of a fire.*
- a) If a sprinkler system is installed,
 - b) If a sprinkler system was installed,
 - c) If a sprinkler system will be installed,
4. ...*take measures to secure the collections and protect them from falling debris.*
- a) If the institution is located in an area subject to seismic activity or to vibration,
 - b) If the institution was located in an area subject to seismic activity or to vibration,
 - c) If the institution would be located in an area subject to seismic activity or to vibration,
5. ...*move sensitive objects to a safer, more stable location during periods of excessive environmental fluctuations.*
- a) If no controls are installed, or if systems are not working,
 - b) If no controls are installed, or if systems will not be working,
 - c) If no controls are installed, or if systems would not be working,
4. ...*take whatever steps are necessary to prevent additional damage.*⁶
- a) If any change in condition of objects would have been discovered,
 - b) If any change in condition of objects had been discovered,
 - c) If any change in condition of objects is discovered,



5. Additional practice links:

Storage Basics Video + worksheet: <https://app.wizer.me/learn/WMUPUI>

Vocabulary Test: <https://quizlet.com/679702193/test>

⁶ Canadian Conservation Institute (CCI) (2002) General Precautions for Storage Areas 1/1, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/precautions-storage-areas.html>. Pristupljeno 3. travnja 2022.



ENVIRONMENTAL REQUIREMENTS FOR COLLECTIONS⁷

When deciding on the environmental requirements for the long-term preservation of cultural collections, those housed in museums, galleries, libraries, archives, historic houses, cultural centres and keeping places, and in private homes, it is necessary to consider a number of parameters which include:

- type, significance, use and condition of the collection;
- type of building housing the collection, and the role the building plays in
- providing a stable environment plus keeping out pests and pollutants;
- regional and local climatic data including seasonal and daily fluctuations;
- technical feasibility to implement and maintain a specific environment within
- the building and taking account of the local climate; and
- ability to fund capital costs, and operating, and maintenance costs.

The next step should consist of a comprehensive risk assessment of the collection and the building in which it is housed. Often, natural and other disasters, frequent and improper handling, pests, and inadequate security and fire protection pose a greater risk to collections than fluctuations in environmental parameters. Available resources should therefore first be invested in the mitigation of the greatest risks.

Once it is determined that environmental settings and fluctuations are the largest remaining threat to the long-term survival of a collection, a plan for environmental improvements can be drawn up. For this purpose it is essential to know the nature and condition of the collection and to fully understand the performance characteristics of the building within the local climate. Any environmental improvements should start with decisions about the safety and integrity of the building envelope and, where applicable, the extent to which they are allowable within the historical/aesthetical context. Only after this task has been accomplished can one sensibly plan ways to further improve the interior environment.

Before deciding on the levels of relative humidity and temperature, permissible fluctuations and seasonal drifts, as well as control mechanisms for air pollutants and light levels, one has to understand if the deterioration of the collection is mostly chemical or mechanical. One should also know what percentages of the collection are of very high, high, medium, or low vulnerability to environmental damage. This can be provided by the risk assessment survey.

⁷ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Environmental Requirements for Collections, https://aiccm.org.au/wp-content/uploads/2020/04/environ_1-1.pdf. Pristupljeno 12. travnja 2022.

Based on this knowledge of the collections, the building, and the local climate one can approach a decision about the proper environmental control systems and settings.

Different standards may be required for different types of collections. The use of microclimates should be considered as a valid strategy for protection of the more vulnerable parts of the collection.

Methodology

1. Determine local climatic conditions. These will vary according to regional climates: tropical, sub-tropical, temperate and inland etc. The regional climate will then be modified by local geographical features and landscapes, proximity to water, industry and transport systems. Use climate data from the Department of Meteorology, noting that it may need to be interpreted for such local factors.
2. Use the information to determine basic temperature and relative humidity set points, and whether seasonal drifts are appropriately considered, and their magnitude.
3. Also determine if problems may arise, due to local levels of air pollution and the potential for infestation by pests, including insects, rodents, birds etc.
4. Carry out a risk analysis of the collections to determine if, and how many of the objects in the collections will be affected, or the effect this might have on securing loans of material from other collections if standards for environmental control are relaxed.
5. Carry out an environmental survey of the internal climate of existing buildings and compare with external values. This would include temperature, relative humidity, air movement and direction, rainfall, daily angle and duration of the sun, illumination and Ultraviolet levels, levels of air pollutants, signs of pests etc.
6. Then, depending on the level of availability of funds to install and maintain facilities and equipment, determine the level and type of building, facilities and equipment required to provide a safe and stable environment for the collections. This would include the building location and surrounding features (landscapes, car parks etc.) design, orientation, structure, materials of construction, interior fittings and fixtures, and involve control of temperature, relative humidity, pollutants, light levels and pests etc.
7. Following construction, check on the performance of the building as designed or retrofitted to ensure design criteria are met, there are no faults, and the building functions according to specifications.
8. Finally, carry out an energy audit of the proposed facilities, to determine whether they are the most cost effective in the long term.

9. Regularly monitor the collection and the costs of providing the required environmental conditions to ensure that the building, facilities and equipment are operating to optimum specifications, and that cost savings are as predicted. Make any necessary modifications and repeat the monitoring.



1. Reading Comprehension

1.1 After reading the text *Environmental Requirements for Collections*, answer the following questions.

1. Where can cultural collections be housed?
2. What are the parameters that need to be considered when deciding on the environmental requirements for the long-term preservation of cultural collections?
3. Which factors represent a greater risk to collections than fluctuations in environmental parameters?
4. What should a plan for environmental improvements include?
5. What are the ways to further improve the interior environment?
6. Which two types of collection deterioration are mentioned in the text?
7. What should the risk assessment survey provide?
8. What should the decision about proper environmental control systems be based on?

1.2 Fill in the blanks with the missing words.

arise, affected, features, rodents, loans, survey, angle, vary, drifts, proximity

1. Determine local climatic conditions. These will _____ according to regional climates tropical, sub-tropical, temperate and inland etc. The regional climate will then be modified by local geographical _____ and landscapes, _____ to water, industry and transport systems. Use climate data from the Department of Meteorology, noting that it may need to be interpreted for such local factors.
2. Use the information to determine basic temperature and relative humidity set points, and whether seasonal _____ are appropriately considered, and their magnitude.
3. Also determine if problems may _____, due to local levels of air pollution and the potential for infestation by pests, including insects, _____, birds etc.
4. Carry out a risk analysis of the collections to determine if, and how many of the objects in the collections will be _____, or the effect this might have on securing _____ of material from other collections if standards for environmental control are relaxed.

5. Carry out an environmental _____ of the internal climate of existing buildings and compare with external values. This would include temperature, relative humidity, air movement and direction, rainfall, daily _____ and duration of the sun, illumination and Ultraviolet levels, levels of air pollutants, signs of pests etc.⁸

2. Vocabulary⁹





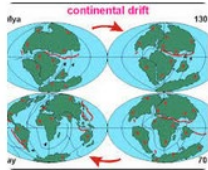
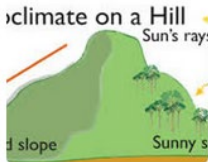
2.1 Match the words on the left with their synonyms or definitions on the right.

1) feasibility	a) evaluation
2) to implement	b) the state or degree of being easily or conveniently done
3) assessment	c) the action of reducing the severity, seriousness, or painfulness of something
4) mitigation	d) susceptible to physical or emotional attack or harm
5) threat	e) nearness
6) vulnerable	f) danger
7) proximity	g) to put into effect
8) magnitude	h) a thorough review
9) audit	i) the great size or importance of something
10) fixture	j) a thing fastened in place

⁸ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Environmental Requirements for Collections, https://aiccm.org.au/wp-content/uploads/2020/04/environ_1-1.pdf. Pristupljeno 20. travnja 2022.

⁹ Quizlet Study Set: Environmental Requirements for Collections, <https://quizlet.com/682798116/environmental-requirements-for-collections-flash-cards/?funnelUUID=d2798789-7db7-4690-8b07-bfbc29401e4a>. Pristupljeno 21. travnja 2022.

3. Visual Glossary¹⁰

pest	any organism that damages valuable items	
pollutant	A substance that causes pollution.	
rodent	an animal with sharp teeth for gnawing	
illumination	lighting or light	
drifts	movements	
microclimate	The climate of a small area	

¹⁰ Quizlet Study Set: Environmental Requirements for Collections, <https://quizlet.com/682798116/environmental-requirements-for-collections-flash-cards/?funnelUUID=d2798789-7db7-4690-8b07-bfbc29401e4a>. Pristupljeno 22. travnja 2022.



4. Grammar

4.1 Transform the sentences below from passive to active. (if the agent is not mentioned, use one/we as the subject of active sentences)

Available resources **should therefore first be invested** in the mitigation of the greatest risks.

One should/we should...

Once **it is determined** that environmental settings and fluctuations are the largest remaining threat to the long-term survival of a collection, a plan for environmental improvements **can be drawn up**.

Only after this **task has been accomplished** can one sensibly plan ways to further improve the interior environment.

This **can be provided** by the risk assessment survey.

Different standards **may be required** for different types of collections.

The use of microclimates **should be considered** as a valid strategy for protection of the more vulnerable parts of the collection.

The regional climate **will then be modified** by local geographical features and landscapes, proximity to water, industry and transport systems.

Use the information to determine basic temperature and relative humidity set points, and whether seasonal drifts **are appropriately considered**, and their magnitude.

Carry out a risk analysis of the collections to determine if, and how many of the objects in the collections **will be affected**, or the effect this might have on securing loans of material from other collections if standards for environmental control **are relaxed**.

Following construction, check on the performance of the building as designed or retrofitted to ensure design criteria **are met**, there are no faults, and the building functions according to specifications.¹¹

4.2 Transform the sentences below from active to passive.

Before deciding on the levels of relative humidity and temperature, permissible fluctuations and seasonal drifts, as well as control mechanisms for air pollutants and light levels, **one has to understand** if the deterioration of the collection is mostly chemical or mechanical.

One should also know what percentages of the collection are of very high, high, medium, or low vulnerability to environmental damage.

¹¹ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Environmental Requirements for Collections, https://aiccm.org.au/wp-content/uploads/2020/04/environ_1-1.pdf. Pristupljeno 15. travnja 2022.

Based on this knowledge of the collections, the building, and the local climate **one can approach** a decision about the proper environmental control systems and settings.¹²

4.3 Use the following verbs in imperative to complete the sentences below.

Check, determine (3x), monitor, use (2x), make, carry out (3x)

1. _____ local climatic conditions.
2. _____ climate data from the Department of Meteorology.
3. _____ the information to determine basic temperature and relative humidity set points.
4. _____ if problems may arise due to local levels of pollution.
5. _____ a risk analysis of the collections to determine if, and how many of the objects will be affected.
6. _____ an environmental survey of the internal climate of the building.
7. _____ the type of building, facilities and equipment required to provide a safe and stable environment for the collection.
8. _____ on the performance of the building to ensure design criteria are met.
9. _____ an energy audit of the proposed facilities to determine whether they are cost effective.
10. _____ the collection and the costs regularly.
11. _____ any necessary modifications and repeat the monitoring.¹³

5. Watch the video *How to store your collection safely*.¹⁴

<https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>

¹² Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Environmental Requirements for Collections, https://aiccm.org.au/wp-content/uploads/2020/04/environ_1-1.pdf. Pristupljeno 18. travnja 2022.

¹³ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Environmental Requirements for Collections, https://aiccm.org.au/wp-content/uploads/2020/04/environ_1-1.pdf. Pristupljeno 19. travnja 2022.

¹⁴ State Library of Queensland, Caring for Collections: How to Store Your Collection Safely, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 5. kolovoza 2022.

5.1 After watching the video, fill in the blanks with the missing words.

coated, lifespan, external, archival, timber, line, cautious, emissions, consistent

What you store your items in and where you store them can affect the safety and 1)_____ of your collection. The furniture that you choose for storage needs to be free from harmful toxins and 2) _____ Aluminum or steel, 3) _____ with baked enamel paint or powder coated steel storage furniture provides the best protection. Be 4)_____ of acidic, timber cabinetry. If it can't be avoided, you can 5)_____ the cabinetry with an archival barrier. Raw 6) _____ is best sealed with a water-based acrylic paint or a waterborne polyurethane varnish. Add an extra level of protection by storing your collections in an 7)_____ box. When choosing a storage location choose a well-insulated space with 8)_____ temperature away from moisture, heat and direct light. That means away from 9)_____ walls and no kitchens, bathrooms or locations near plumbing.¹⁵

5.2 Put the items of the housekeeping checklist in the same order as they appear in the video.

- _____ rust on metal storage units
- _____ dirty air conditioning filters
- _____ checking for pests and mould activity
- _____ evidence of water or heat damage
- _____ maintain a regular housekeeping checklist
- _____ unusual chemical or organic smells
- _____ a regular cleaning routine will keep the storage environment dust-free and reduce pest activity and the chance of mould growth.
- _____ and sticky or tacky timber furniture
- _____ security or seal breaches on windows and doors

¹⁵ State Library of Queensland, Caring for Collections: How to Store Your Collection Safely, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 6. kolovoza 2022.

5.3 Discuss the meaning of the following sentence. How can you play your part in caring for history for future generations?

By using safe storage materials, maintaining a stable storage environment and having a regular cleaning routine, you can play your part in caring for our history.



6. Additional practice test link:

<https://quizlet.com/682798116/test>



CONSERVATION PROBLEMS FACING CULTURAL COLLECTIONS (part 1)¹⁶

It is generally accepted that the factors causing the most damage to cultural collections are temperature (T), relative humidity (RH), light levels, (specifically illumination and UV radiation), air pollution (gases and particulates such as dust and soot), and pests (including insects, rodents and birds) and probably most important, people. The latter includes mismanagement, mishandling and carelessness. It is important to control, or at least reduce, the effects of these agents in order to ensure the long-term preservation of cultural collections. Before discussing the recommended environments for cultural collections in different climatic zones, it is first necessary to understand what damage can be caused to such collections by these agents of deterioration.

3.1. Temperature

Temperature alone can cause damage to collections. An increase in temperature will cause an increase in chemical reaction rates, the general rule being that there will be a doubling of reaction rates for every 10°C rise in temperature. Materials particularly prone to damage by high temperatures are those which tend to self destruct such as acidic paper, acetate and nitrate films, celluloid and rubber, also objects which contain waxes or resins such as ethnographic collections and wax/resin lined paintings.

The variation of temperature, between night-time minimum and day-time maximum, are generally small in hot humid environments, but can be large in hot dry and temperate climates. These 'diurnal' fluctuations are more damaging than relatively large seasonal changes in temperature, where there is plenty of time for materials to adjust to the changed conditions. High diurnal changes can cause damage to objects with restrained layers, such as enamels, and possibly wooden veneers and inlays, through expansion and contraction.

The other and probably most significant influence of temperature is its relationship with relative humidity. In an enclosed space such as a museum, display room or display case where there is not much air exchange, an increase in temperature will cause a decrease in relative humidity, and vice versa. Therefore, high fluctuating temperatures will induce high fluctuating relative humidities, but in the opposite direction, and as will be discussed in the following section, such changes in RH are in most cases much more damaging than changes in temperature.

¹⁶ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Conservation Problems Facing Cultural Collections (part1) https://aiccm.org.au/wp-content/uploads/2020/04/enviro_n_1-1.pdf. Pristupljeno 30. travnja 2022.

3.2. Relative humidity

Relative humidity (given in percentages) is defined as the amount of water vapour present in a given volume of air, divided by the maximum amount of water which the air can hold at that temperature. As with temperature, a high Relative Humidity (RH) increases deterioration rates of most materials by providing more water to take part in chemical reactions.

The main problems caused by relative humidity are that if too high, above an RH of about 70 per cent, there is the probability of fungal growth, and also the corrosion of metals and crizzling of glass objects. If too low, below approximately 40 per cent, desiccation of organic materials will occur.

This is accentuated further by high and rapid fluctuations in RH. However, it has been found that few materials will respond significantly to fluctuations of less than one hour duration. Therefore, the fluctuations which characterise the controlled cycling of air conditioners (especially the 'wall type') for example, are normally unimportant. Due to the main fluctuations of RH being experienced on a diurnal basis, allowable per cent RH fluctuations are normally specified on a daily basis, and sometimes in addition, as an allowable seasonal variation on an annual basis.

The extreme level of high RH occurs with precipitation rain, which can be high in some climatic zones and at certain times of the year. It is necessary to protect against rain entering a building, remembering that rain can often be blown horizontally by strong winds. If rain falls relatively evenly over the year, then there should not be too many problems. However, in 'wet seasons' when 80 per cent of the annual precipitation may fall in a few months, and on a daily basis is followed by hot sunshine which evaporates the rain, extreme daily cycles of relative humidity may be experienced.

When there are extreme fluctuations of RH, this creates a dangerous situation. In response, moisture will move in and out of organic materials, causing them to expand and contract in a cyclic fashion. In time, this will cause the material to disintegrate. Fluctuations in internal RH levels can be caused by an external fluctuating temperature on a building, direct sunlight being able to enter a building and falling on an object or display case, the turning on and off of incandescent spot lights, or an air-conditioning system being turned on during the day and off at night etc.

There are about 100,000 species of fungi, of which a relative few, the surface fungi including *Aspergillus Niger*, *Cladisporium*, *Penicillium* and *Stachybotrys*, are of concern to the conservator. They grow on and in organic materials, and this is known as mould, which can produce brightly coloured surfaces. The growing or food-getting part of a fungus is made up of long, hollow, branched cells called hyphae, which as an aggregate are called mycelium or the fungal colony. They reproduce by the means of spores, which falling on a moist substrate will germinate within hours under the right conditions. Because the spores are so light they can travel over long distances, even with only minor air movement.

As fungal spores are always present in the atmosphere, they just require a sustained high RH for a certain period of time depending to some extent on the fungal species for the spores to propagate. The higher the RH the shorter the time. For continuing viability, fungi require water, oxygen, heat and food. The most important of these is water, as fungal tissue itself consists of about 95 per cent water. Fungi become more tolerant to different moisture conditions the better the source of nutrient. Organic materials such as paper, textiles, leather, especially if containing waxes, fats or oils, are ideal nutrients for fungal growth. Fungi can also grow on the surfaces of inorganic materials such as metal, glass and ceramics if water has condensed there, and especially if dirt and dust are present to provide nutrients. Fungi are very temperature tolerant, being active between 0- 60°C, the optimum being 15- 20°C. Many different species can be found inside any building.

As mentioned earlier, fungi require an RH of above approximately 70 per cent to germinate and grow. However, it is necessary here to consider not just the RH of the air surrounding an object but also the moisture condition of the surface of the object. If the object has a high moisture content then even though the RH of the surrounding air may be relatively low, there may be sufficient moisture present on the surface for mould to grow. On the other hand, even in a high RH if there is sufficient air movement at the surface of an object, this may be sufficient to reduce the surface moisture content to below the mould formation level. Surface moisture conditions are more important than the RH of the surrounding air.



1. Reading Comprehension

1.1 After reading the text *Conservation Problems Facing Cultural Collections*, answer the following questions.

1. What are the factors causing the most damage to cultural collections?
2. What types of damage are caused by people?
3. What kind of damage does an increase in temperature cause?
4. What is the rate of an increase in chemical reactions for every 10 °C?
5. What is meant by diurnal fluctuations of temperature? Are they more or less harmful than seasonal fluctuations?
6. Which materials are particularly prone to diurnal fluctuations of temperature?
7. What is the relationship between fluctuations of temperature and relative humidity (RH)?
8. What is relative humidity (RH)?
9. What is considered to be too high and what too low RH? What are the consequences of each?
10. When does the extreme level of high RH occur?
11. How do organic materials react in response to extreme fluctuations of RH?
12. Where do fungi grow, what parts are they made of and how do they reproduce?

13. What do fungi need for continuing viability?
14. Can fungi grow both on organic and inorganic materials?
15. Which organic materials are ideal for their growth?
16. Are they tolerant of temperature fluctuations?
17. Which is more important for fungi growth: surface moisture conditions of the object or the surrounding RH?

1.2 Fill in the blanks with the missing words.

hyphae, minor, viability, mycelium, tissue, germinate, concern, mould, propagate

There are about 100,000 species of fungi, of which a relative few, the surface fungi including *Aspergillus Niger*, *Cladisporium*, *Penicillium* and *Stachybotrys*, are of 1)_____ to the conservator. They grow on and in organic materials, and this is known as 2)_____, which can produce brightly coloured surfaces. The growing or food-getting part of a fungus is made up of long, hollow, branched cells called 3)_____, which as an aggregate are called 4)_____ or the fungal colony. They reproduce by the means of spores, which falling on a moist substrate will 5)_____ within hours under the right conditions. Because the spores are so light they can travel over long distances, even with only 6)_____ air movement.

As fungal spores are always present in the atmosphere, they just require a sustained high RH for a certain period of time depending to some extent on the fungal species for the spores to 7)_____. The higher the RH the shorter the time. For continuing 8)_____, fungi require water, oxygen, heat and food. The most important of these is water, as fungal 9)_____ itself consists of about 95 per cent water.¹⁷

¹⁷ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Conservation Problems Facing Cultural Collections (part1) https://aiccm.org.au/wp-content/uploads/2020/04/environ_1-1.pdf. Pristupljeno 3. svibnja 2022.



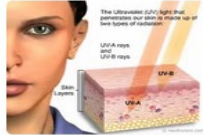





2. Vocabulary¹⁸

2.1 Match the words on the left with their synonyms or definitions on the right.

1) particulate	a) increase in size
2) to line	b) to happen, to take place
3) diurnal	c) to change from a gas to a liquid
4) to expand	d) a group or mass
5) to contract	e) to multiply, spread out
6) to induce	f) a tiny particle of solid that is suspended in air or water
7) to occur	g) a feeling of worry for someone or something
8) to evaporate	h) ability to exist or survive
9) to condense	i) a group of similar cells that perform the same function
10) cyclic	j) to cover the inner surface of
11) concern	k) glass deterioration
12) an aggregate	l) a substance that provides nourishment essential for growth and the maintenance of life
13) to disintegrate	m) wetness caused by water
14) to propagate	n) happening or active during the day
15) viability	o) to draw together, to reduce in size
16) tissue	p) occurring in cycles; regularly repeated
17) nutrients	q) to decay; decompose; break up
18) moisture	r) to change from a liquid to a gas
19) crizzling	s) to cause to happen

¹⁸ Quizlet Study Set: Conservation Problems Facing Cultural Collections (part 1), <https://quizlet.com/686026577/conservation-problems-facing-cultural-collections-1-flash-cards/?funnelUUID=fdb2909d-b092-4fb5-8a40-36f386a6f88d>. Pristupljeno 5. svibnja 2022.

3. Visual Glossary¹⁹

UV radiation	ultraviolet radiation from the sun	 The diagram shows a cross-section of human skin with layers labeled 'Skin' and 'UVB'. It illustrates how UVB rays penetrate the skin, while UVA rays are shown as being blocked by the outer layer. A small inset shows a person's face.
soot	black powder in smoke	 A photograph showing thick, dark black smoke or soot rising from a source, partially obscuring a building in the background.
rubber	a tough elastic polymeric substance made from the latex of a tropical plant or synthetically.	 A photograph of a rectangular rubber eraser, split vertically into a red half and a blue half.
wax	a substance that is secreted by bees and is used by them for constructing the honeycomb	 A photograph of a dark, textured honeycomb structure, likely made of wax, with a small red arrow pointing to it.
resin	A thick, slowly flowing liquid produced by plants that can harden into a solid	 A photograph of a small insect, possibly a bee, encased in a transparent, yellowish-brown resin block.
veneer	(n.) a thin outer layer; a surface appearance or decoration	 A photograph of a curved, light-colored wooden veneer or laminate surface.
inlay	substance embedded in another, contrasting material	 A photograph of a decorative surface, possibly stone or wood, featuring intricate inlaid patterns in contrasting colors.
desiccation	drying out	 A photograph showing a close-up of dry, cracked earth, illustrating the process of desiccation.
precipitation	Any form of water that falls from clouds and reaches Earth's surface.	 A photograph of a winter scene with snow falling from clouds onto a snowy landscape with trees and a body of water.

¹⁹ Quizlet Study Set: Conservation Problems Facing Cultural Collections (part 2), <https://quizlet.com/686033318/conservation-problems-facing-cultural-collections-2-flash-cards/?funnelUUID=b93a14ae-3a2c-4fce-a116-a779dec1c950>. Pristupljeno 7. svibnja 2022.

incandescent	brilliant; giving off heat or light	
mycelium	densely branched network of the hyphae of a fungus	
spores	single-celled reproductive bodies highly resistant to cold and heat damage; capable of new organisms	
to germinate	to begin to grow, to sprout	

4. Grammar

Materials particularly **prone to** damage by high temperatures are those which tend to self destruct such as acidic paper, acetate and nitrate films, celluloid and rubber, also objects which contain waxes or resins such as ethnographic collections and wax/resin lined paintings.²⁰

The phrase **to be prone to** is very frequently used in texts and documents on restoration and conservation. In order to use the phrase correctly, pay attention to the grammatical structures that follow.

Antique wooden furniture **is prone to infestation** by termites. (noun)

Antique wooden furniture **is prone to being infested** by termites. (gerund)

Antique wooden furniture **is prone to be infested by** termites. (infinitive)

Synonyms: **to be susceptible to, to be liable to, to be subject to, to be sensitive to**

²⁰ Australian Institute for the Conservation of Cultural Materials (AICCM) (2002) *Guidelines for Environmental Control in Cultural Institutions*, Consortium for Heritage Collections and their Environment, Conservation Problems Facing Cultural Collections (part1) https://aiccm.org.au/wp-content/uploads/2020/04/enviro_n_1-1.pdf. Pristupljeno 10. svibnja 2022.

4.1 Rewrite the sentences below by replacing the phrase *to be prone to* by one of the phrases with similar meaning.

1. Our city is situated in an area *prone to* earthquakes.
2. The lack of rain and moisture has made the wheat crop *prone to* disease.
3. Some chemicals may make people more *prone to* allergic reactions.
4. It is obvious that this computer system is *prone to* crashing.
5. Lately I have been *prone to* catching a flu.
6. People who are tense and under stress are *prone to* making mistakes.
7. The country is also *prone to* outbreaks of contagious diseases.
8. The adults are not as *prone to* sunburn as the kids.
9. This is a mistake that Italians seem especially *prone to* make when speaking English.
10. Ocean countries are particularly *prone to* storm damage.

5. Watch the video *How to House Your Collection*.²¹

<https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>

5.1 After watching the video, answer the following questions.

1. What are the two types of safe protective materials?
2. When is it advisable to use paper enclosures?
3. When should you use plastic enclosures?
4. What kind of plastic should be used for this purpose?
5. What does it mean to buffer (e.g. a paper)?
6. When are you advised to use buffered and when non buffered paper?
7. When packing your collection for storage, which items can be used?
8. What does it mean to laminate? Should your collection items be laminated? Why?

²¹ State Library of Queensland, Caring for Collections: How to House Your Collection, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 7. kolovoza 2022.

5.2 Fill in the blanks with the missing words.

lamine, humid, tissue, longevity, sleeves, migrating, cellulose, sturdy

Polyester products like Mylar or Melinex work best. Polypropylene 1)_____ are another good choice. But you should never 2)_____. If you are using paper enclosures, look for materials that are 100% 3)_____ and free from acid and lignin. As a general rule, choose 'buffered' papers for paper items and 'nonbuffered' for photographs and objects. When packing your collections use stable archival fabrics and 4)_____ paper to support your items. Archival corrugated board boxes are a great option for storage. Plastic tubs or polypropylene boxes provide a 5)_____ option for storage but may be problematic in 6)_____ environments. Good ventilation will be required. If you are using a wooden storage box, one option is to line it first to reduce the risk of harmful chemicals 7) _____ from the wood to your collection. By investing in safe materials to house and store your items you will ensure the 8) _____ of your collection and play your part in caring for our history.²²



6. Additional practice test links:

<https://quizlet.com/686026577/test>

<https://quizlet.com/686033318/test>

²² State Library of Queensland, Caring for Collections: How to House Your Collection, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 8. kolovoza 2022.



Unit 4

BUFFERED AND UNBUFFERED STORAGE MATERIALS²³

Storage Materials

Storing museum objects in archival-quality materials is essential for their long-term preservation. The housing enclosures used to store objects are usually in prolonged and direct contact with the object and form its immediate environment. It is essential that enclosures be made of archival-quality materials that are chemically stable. These enclosures also help to organize the collections; protect objects from light, dust, dirt, air pollutants, and handling; and provide some protection against sudden changes in temperature and relative humidity.

Paper products used for housing museum collections are available in a wide variety of types and sizes. Folders, envelopes, tissue paper, board, album pages, trays, and boxes are some of the many commercial paper products that are used in parks to house, store, display, and pack museum collections.

Paper was initially made by hand from rag (cotton or linen) which produced a strong, long-fibered paper. Since the 19th century, paper-making processes have produced inexpensive paper made from wood fiber. Most paper made from wood fibers contains lignin, which holds cellulose fibers together in the tree. Over time lignin deteriorates and produces acid that breaks down and weakens the paper. In addition, some paper is treated with alum-rosin sizing to control water absorption. This sizing produces sulfuric acid that can accelerate the deterioration process. Not only will poor-quality paper deteriorate but the acid produced during the deterioration process can migrate and contaminate the materials in contact with it.

Paper made from wood pulp can be chemically purified to remove acid-producing properties, resulting in a more stable paper. Over time, however, the residual chemicals used to purify paper, those used to improve the appearance of paper (for example, bleaching agents), and air pollutants can cause acids to form which may migrate to the object inside.

The term acid-free is generally used to describe the paper products recommended for object, archival, and manuscript storage. Paper that is pH 7 or higher is considered acid-free. Longer lived acid-free papers are made with alpha cellulose stock and have little or no lignin.

²³ National Park Service Conserve O Gram Number 4/9 (1995) Buffered and Unbuffered Storage Materials, <https://www.nps.gov/museum/publications/consveogram/04-09.pdf>. Pristupljeno 16. svibnja 2022.

The pH scale (below) measures the most acidic (pH 1) to the most alkaline (pH 14) with pH 7 being neutral.

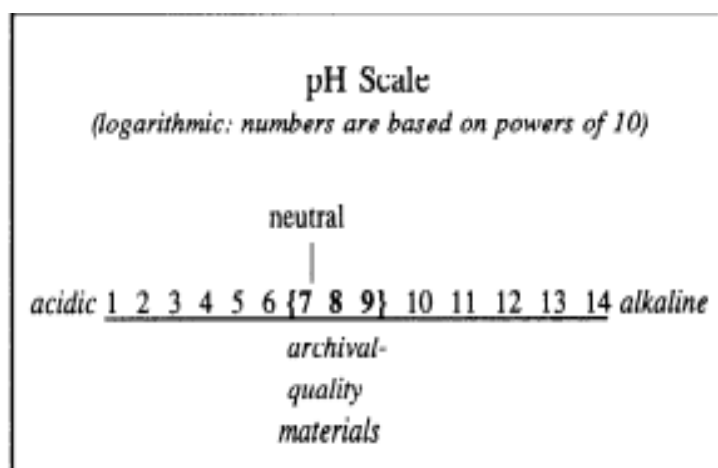


Image 1²⁴

Buffered Paper

Buffered paper products have an alkaline reserve, or buffering agent, added during production to alter the pH. Buffering protects the museum object against migrating acids. Calcium carbonate and magnesium carbonate are the common buffering agents. Because this alkaline reserve depletes over time, storage containers that were once acid-free can become acidic. Buffered paper is alkaline at about 7.5 to 8.5 pH.

Unbuffered and Neutral Paper

Unbuffered acid-free paper products are neutral or slightly alkaline but do not contain an alkaline reserve. Neutral paper has a pH of 7-7.5, and does not contain acid. It has a limited capacity to absorb acids from the environment or from objects housed inside, whereas alkaline buffered materials can help neutralize acids as they form. (See Conserve O Gram 1412, Storage Enclosures for Photographic Prints and Negatives.) Unbuffered acid-free paper is pH neutral at the time of manufacture; however, the pH value will drop when exposed to normal atmospheric conditions.

NOTE: Most objects can be safely housed in unbuffered neutral pH material (exceptions are listed in the table). When in doubt about the type of enclosure or container to use, an unbuffered neutral pH enclosure is recommended.

The following table serves as a quick reference for the use of buffered or unbuffered products for the storage of objects. Refer to NPS Museum Handbook, Part I (Rev 9/90) for the specific types of storage enclosures and containers

²⁴ National Park Service Conserve O Gram Number 4/9 (1995) Buffered and Unbuffered Storage Materials, <https://www.nps.gov/museum/publications/conserveogram/04-09.pdf>. Pristupljeno 17. svibnja 2022.

recommended for each object type and condition. Often, depending upon condition and stage of deterioration, similar objects should be placed in very different types of storage containers. Consult a conservator for advice if questions remain concerning proper housing.

<i>Object Type</i>	<i>Buffered Materials</i>	<i>Unbuffered Materials</i>	<i>Remarks</i>
Archeological Materials		Depending on the objects, many are housed in plastic such as polyethylene and polypropylene; use unbuffered tissue if padding is needed.	Buffered is not recommended because of the possibility of influencing research chemical analysis by placing object in an alkaline environment. See NPS, <i>Museum Handbook</i> , Part I (Rev 9/90), Appendix I, for storage guidelines.
Archival & Library	Books, damaged or rare, (house in archival rare book boxes) Flat documents Manuscripts Maps Most papers (with exceptions listed under unbuffered); Posters	Albums and collages with wool or silk components Blueprints Diaz reproductions Handtinted materials (maps, etc.) Friable media (especially pastel and charcoal) should be stored in shallow boxes.	Buffered materials are preferable for storage of archival items with exceptions listed at left under <i>Unbuffered</i> . Buffered materials can alter the pigment color, so when storing handtinted or other color friable media mounted on acidic board, place in unbuffered pH neutral enclosure with a slip sheet of buffered next to the acidic board.
Archival & Library: Photographic Materials	Cellulose-nitrate and acetate and early safety film negatives NOTE: Cellulose-nitrate is a fire hazard. The NPS policy for preserving it is by duplicating it onto safety film and storing the original in an appropriate storage facility. See NPS <i>Museum Handbook</i> , Part I (Rev 9/90), Appendix M, Curatorial Care of Cellulose Nitrate Negatives.	Monochrome processes, including: Albumen prints Ambrotypes Collodion prints Cyanotypes Daguerreotypes Gelatin prints Glass negatives Lantern slides Palladian prints Platinum prints Salted paper Sunprints Color images and negatives, including: Chromogenic photographs Dye transfer prints Polaroid prints	Current research indicates that buffered enclosures housing salted paper, albumen, gelatin, platinum and collodion-processed prints are <i>not</i> detrimental provided RH levels are maintained . It is <i>not</i> necessary to replace present buffered enclosures with unbuffered materials for these media. Any materials used to store photographs should have passed the Photographic Activity Test (PAT). See <i>Conserve O Gram</i> 14/2, Storage Enclosures for Photographic Prints and Negatives.
Works of Art on Paper	Prints Drawings	Watercolors Handtinted prints, drawings and other art	
Ethnographic Materials	Cellulosic (plant-derived) materials: Bark Cotton Linen Paper Wood	Proteinaceous (animal-derived) materials: Antler Quill Bone Silk Horn Skin Ivory Wool Leather	Ethnographic objects are often complex and could contain materials sensitive to buffered environment. If in doubt, use unbuffered neutral pH materials. See also <i>Remarks</i> under <i>Textiles</i> below.

<i>Object Type</i>	<i>Buffered Materials</i>	<i>Unbuffered Materials</i>	<i>Remarks</i>
Film	Black/white motion picture film	Color motion picture film	NOTE: Cellulose nitrate film is a fire hazard. The NPS policy for its preservation is by duplicating it onto safety film and storing the original in an appropriate storage facility. See NPS Special Directive 93-2 "Preserving NPS Cellulose Nitrate Film Collections," and NPS <i>Museum Handbook</i> , Part I (Rev 9/90), Appendix M, Curatorial Care of Cellulose Nitrate Negatives.
Metal		Silver (Use acid- and sulphur-free tissue for wrapping to prevent tarnish.) Iron, lead, and other metals	Heavy, stiff tissue may scratch some soft metal; use a soft, neutral pH tissue.
Natural History Specimens	Herbarium collections	Insects (pinning trays) Skeletal material Birds and mammals	Does not apply to wet specimens except for label (unbuffered).
Textiles		All Textiles	Many references recommend buffered for plant derived material (cotton, linen) and unbuffered for animal derived material (wool, silk). The NPS Harpers Ferry Center Division of Conservation recommends that all textiles be wrapped in soft, unbuffered, neutral pH tissue. This recommendation is not based on chemistry, but is offered as a means to eliminate confusion because there are many buffered tissues. Many have hard, sharp corners when folded or crumpled and are too heavy or stiff for some fabrics.

Image 2²⁵

1. Reading Comprehension

1.1 After reading the text *Buffered and Unbuffered Storage Materials*, answer the following questions.

1. What should storage enclosures and containers be made of to ensure the long-term preservation of museum objects?
2. What role do storage enclosures and containers play in the process of preservation of museum objects?
3. What material are storage enclosures and containers mostly made of?
4. Name different types of paper enclosures!
5. What was paper originally made of and what has it been made of since the 19th century?

²⁵ National Park Service Conserve O Gram Number 4/9 (1995) Buffered and Unbuffered Storage Materials, <https://www.nps.gov/museum/publications/conserveogram/04-09.pdf>. Pristupljeno 18. svibnja 2022.

6. Which chemical represents a problem when using paper made from wood fibers?
7. What kind of damage does the acid produced in that process cause?
8. Is chemically purified paper a good long-term solution?
9. What are the characteristics of paper that is considered to be acid-free?
10. What are the characteristics of buffered paper?
11. What are the characteristics of unbuffered and neutral paper?
12. What kind of paper is considered to be safe for the storage of the majority of museum objects?

1.2 Study the table from the text and decide whether the following statements are true or false.



1. Depending upon condition and stage of deterioration, similar objects should be placed in very different types of storage containers.
2. Buffered is not recommended for storage of archaeological materials because it can influence research chemical analysis by placing the object in alkaline environment.
3. Friable materials can safely be stored in buffered materials because they do not alter pigments or colour.
4. Film negatives can safely be preserved inside enclosures containing buffered materials.
5. Prints and drawings should never come into contact with buffered materials.
6. Ethnographic objects are often complex in their nature and it is safer to place them in unbuffered environment.
7. Black/white motion films are preferably kept in unbuffered containers while colour motion films can safely be preserved in buffered enclosures.
8. All metals such as silver, lead and iron have to be kept in buffered containers.
9. Natural history specimens including insects, skeletal material, birds and mammals should not be stored in enclosures containing buffered materials.
10. It is recommended that all textiles should be wrapped in soft, unbuffered, neutral pH tissue.

2. Vocabulary²⁶

2.1 Match the words on the left with their synonyms or definitions on the right.


1) prolonged	a) to speed up, move faster
2) available	b) to move from one place to another
3) absorption	c) to pollute
4) to accelerate	d) having a pH greater than 7
5) to migrate	e) ready for use
6) to contaminate	f) the process or action by which one thing absorbs or is absorbed by another
7) to purify	g) pH below 7
8) residual	h) continuing for a long time
9) bleach	i) to use up gradually
10) acidic	j) to leave without protection
11) alkaline	k) left over; remaining
12) to buffer	l) to prevent sharp, sudden changes in pH
13) to deplete	m) to whiten, to make lighter
14) to expose	n) to make clean and free of dirt or pollutants




3. Visual glossary²⁷

dust	a powder of dirt or soil that you see on a surface or in the air	
pollutant	A material found in air, water, or soil that is harmful to humans or other organisms	

²⁶ Quizlet Study Set: Buffered and Unbuffered Storage Materials 1, <https://quizlet.com/689010547/buffered-and-unbuffered-storage-materials-1-flash-cards/?funnelUUID=fca67d8d-c3ae-4516-a208-4383c3537c9b>. Pristupljeno 10. svibnja 2022.

²⁷ Quizlet Study Set: Buffered and Unbuffered Storage Materials 2, <https://quizlet.com/689013455/buffered-and-unbuffered-storage-materials-2-flash-cards/?funnelUUID=e47cc363-7f51-4c05-948c-69038709ff37>. Pristupljeno 11. svibnja 2022.

folder	a collection of files	
envelope	outer covering made of paper	
tray	A flat plate used to hold food	
rag	scrap of cloth	
wood pulp	wood that has been ground to a pulp	
friable media	easily crumbled, brittle media such as chalk, pastels	
cellulose	A substance (made of sugars) that is common in the cell walls of many organisms	 Polysaccharide (Cellulose)
sizing	any of several substances made from glue, wax, or clay, used as a filler for porous material such as paper, canvas, or other cloth, or wall surfaces	
antler	(n.) the horn of a deer, elk, or moose	

ivory	hard white material made from elephant tusks	
quill	feather	
tarnish	make dirty or spotty, as by exposure to air, moisture, acid	
mammal	A warm-blooded vertebrate that feeds its young milk.	

4. Grammar

Study the following sentence from the text.

*It is essential that enclosures be made of archival-quality materials that are chemically stable.*²⁸

It is essential/vital/ important that + subject + (should) + verb

4.1 Complete the sentences with the correct form of the verbs in brackets.

1. For the device to function properly, it is essential that the plug (be) in good condition.
2. It is essential that information (be) provided in case of emergency.
3. It is essential that the pH of the archaeological material (stay) stable.
4. It is essential that you (stay) precise in these calculations.
5. It is essential that our brand name (become) well established.
6. It is essential that the noise levels (be) reduced in the future.

²⁸ National Park Service Conserve O Gram Number 4/9 (1995) Buffered and Unbuffered Storage Materials, <https://www.nps.gov/museum/publications/conserveogram/04-09.pdf>. Pristupljeno 20. svibnja 2022.

7. It is essential that we (provide) the students with guidelines before writing an essay.
8. It is essential that a restorer (focus) on reversibility of the treatment.
9. It is essential that all students (participate) in the program.
10. For democratic elections it is essential that the majority of people (vote).

Study the following sentence from the text.

Since the 19th century, paper-making processes have produced inexpensive paper made from wood fiber.

For two centuries, paper-making processes have produced inexpensive paper made from wood fiber.²⁹

Since + a point in time + present perfect/present perfect continuous

For + a period of time + present perfect/ present perfect continuous

4.2 Complete the sentences with since and for.

1. I have been varnishing this wooden surface _____ 2 hours.
2. He has been working in that conservation lab _____ a long time.
3. We have finished retouching the ceramic vase _____ you left.
4. There hasn't been a flood in that museum _____ 2020.
5. There has been some criticism _____ the restoration of the cathedral was completed.
6. They have been monitoring the wooden cabinet for signs of infestation _____ two weeks now.
7. How long has it been _____ they started monitoring RH the storage area?
8. Silver artefacts have started tarnishing _____ we placed them inside that display case.
9. They have been analyzing chemical characteristics of glass _____ a week.
10. Unbuffered materials have been used for storage of all textiles in our museum _____ the beginning.

²⁹ National Park Service Conserve O Gram Number 4/9 (1995) Buffered and Unbuffered Storage Materials, <https://www.nps.gov/museum/publications/consveogram/04-09.pdf>. Pristupljeno 23. svibnja 2022.



5. Watch the video *How to Safely Handle Your Collection* on the following page.³⁰

Video link: <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>

5.1 Read the transcript of the video and fill in the blanks with the missing words.

Fitted, cradle, sturdy, minimize, steady, unique, weak, brittle,

Careless handling is one of the most common causes of damage to collections. If you are required to handle your collection, use 1) _____, powder-free gloves. Clean cotton or nitrile gloves work best. Before handling take a moment to examine each item. What do you see? Is there any damage? Any 2) _____ points? If so, try to avoid these areas. Each item will have 3) _____ handling needs. Always provide adequate support to items. Use two hands; one from below to support the item and the other hand to 4) _____ it. And remember to hold items from their strongest point. Don't rely on handles or attachments as these might not be as 5) _____ as they once were. When handling 6) _____ and fragile items always support from underneath. Placing your item on a board will 7) _____ damage from handling. You can even use a pillow to 8) _____ fragile objects when viewing or moving them around. By handling your collection as little as possible and using safe handling techniques you can play your part in caring for our history.³¹

5.2 Use monolingual dictionary Merriam-Webster

<https://www.merriam-webster.com/>

Find synonyms or definitions for the following terms.

Nitrile gloves

To steady

Sturdy

Brittle

Fragile

To cradle

³⁰ State Library of Queensland, Caring for Collections: How to Safely Handle Your Collection, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 8. kolovoza 2022.

³¹ State Library of Queensland, Caring for Collections: How to Safely Handle Your Collection, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 9. kolovoza 2022.



6. Additional Practice Tests:

<https://quizlet.com/689010547/test>

<https://quizlet.com/689013455/test>



CLEANING GLASS AND ACRYLIC DISPLAY CASES – CCI NOTES 1/2³²

Plastics: Common Cleaners and Procedures

A wide range of transparent plastic materials are available from suppliers, including acrylics, polycarbonates, and styrenes. For museum applications, acrylic materials are generally preferred due to their transparency and toughness, and because they are easy to work with and to maintain. These materials include such products as Plexiglas, Acrylite, and Perspex.

Cleaning

Many household cleaners contain abrasives that may scratch acrylic sheet, and some also contain solvents that can cause crazing (the development of fine surface cracks). Also, acrylics tend to generate static electricity during cleaning and use, which causes dust to accumulate by electrostatic attraction. Plastics manufacturers, therefore, market specific cleaners for their own products that minimize static electricity and that do not cause scratching or crazing. The reader is advised to contact the suppliers listed at the end of this Note for information on all cleaning applications.

Stubborn Marks

Grease stains and traces of self-adhesive backing can be removed from acrylic sheet with kerosene or naphtha. **Use these solvents with caution in a well-ventilated area.** Stronger solvents are not recommended because they can cause the material to craze and soften.

Scratch Removal

Very shallow scratches can be removed from acrylic sheet with fine abrasives. Pre-polishes for automotive finishes can be used if the scratches are minimal. However, scratch removal can be very laborious and only the finest scratches in discrete areas can be removed in this way. Suppliers of acrylic sheet sell scratch removal kits and provide detailed instructions on how to use them. Compare the cost of the kit and the labour involved with the cost of replacing the scratched item to determine which method is most cost-effective.

³² Canadian Conservation Institute (CCI) (1996) Cleaning Glass and Acrylic Display Cases 1/2, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/cleaning-glass-acrylic-display-cases.html>. Pristupljeno 1. lipnja 2022.

Further information on the use and care of acrylic products is available from the suppliers listed below.

Glass: Common Cleaners and Procedures

Glass is heavier and less flexible than plastic sheet. It is used for display cases where high transparency, resistance to shock, and security are required. In general, tempered glass is preferred over plastic for safety reasons.

Cleaning

Glass is resistant to mild abrasives, solvents, and acidic or alkaline cleaners. Therefore, commercially available window cleaning products work very well when used as directed. However, with most display case applications, there are attached components that may be affected by water, solvents, acids, or alkalis. For example, the framing of glass panels may be made with wood mouldings or aluminum sections, either of which might be damaged by excessive application of wet cleaners. For this reason, apply a product such as Windex sparingly to the centre of the glass and wipe it outwards to the edges with a soft, lint-free cloth. Once the glass is judged to be clean, buff it with a dry cloth.

Stubborn Marks

Grease and adhesive tape stains can be removed from glass with kerosene or naphtha, but stronger solvents such as acetone can also be used without risk. **Use these solvents with caution in a well-ventilated area.**

Scratch Removal

Glass is normally very resistant to scratching. However, once scratched, glass is very laborious and time consuming to restore. In almost all cases, it is preferable to replace the glass.



1. Reading comprehension

1.1 After reading *Cleaning Glass and Acrylic Display Cases* check your understanding by answering the following questions.

1. Why are acrylic materials preferred for museum applications and what are their characteristics?
2. Why is it recommended to use specific cleaners when dealing with acrylic materials?
3. Explain the following terms: an abrasive, a solvent!
4. Define the following terms: crazing, static electricity!
5. How can grease stains be removed safely from acrylic surfaces?
6. Which procedures are advised for scratch removal from acrylic surfaces?
7. Compare glass to acrylic materials?
8. What are general directions for glass cleaning?
9. How can we deal with grease stains on glass?
10. What is the best solution for dealing with scratched glass?

1.2 Fill in the blanks with the missing words.

available, buff, attached, edges, sparingly, excessive, resistant, framing

Glass is 1)_____ to mild abrasives, solvents, and acidic or alkaline cleaners. Therefore, commercially 2) _____ window cleaning products work very well when used as directed. However, with most display case applications, there are 3)_____ components that may be affected by water, solvents, acids, or alkalis. For example, the 4)_____ of glass panels may be made with wood mouldings or aluminum sections, either of which might be damaged by 5)_____ application of wet cleaners. For this reason, apply a product such as Windex 6)_____ to the centre of the glass and wipe it outwards to the 7) _____ with a soft, lint-free cloth. Once the glass is judged to be clean, 8)_____ it with a dry cloth.³³

³³ Canadian Conservation Institute (CCI) (1996) *Cleaning Glass and Acrylic Display Cases* 1/2, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/cleaning-glass-acrylic-display-cases.html>. Pristupljeno 5. lipnja 2022.






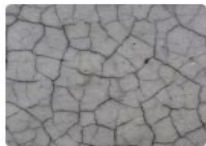




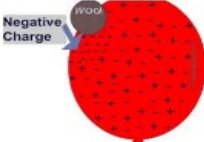
2. Vocabulary³⁴

2.1 Match the words on the left with their synonyms or definitions on the right.






1) To accumulate	a) a liquid substance capable of dissolving other substances
2) solvent	b) a substance that unites or bonds surfaces together
3) backing	c) to fasten or join one thing to another
4) caution	d) gentle, not harsh
5) adhesive	e) to polish and make shiny
6) discreet	f) takes a long time to do
7) cost-effective	g) care taken to avoid danger or mistakes
8) mild	h) a mark that is difficult to remove, especially one made by a liquid such as blood, coffee, or ink
9) to attach	i) to support
10) alkali	j) to increase in number or amount; to pile up, collect, or gather
11) to buff	k) a base that dissolves in water
12) time consuming	l) not likely to be seen or noticed by many people
13) stain	m) producing good results without costing a lot of money
14) to scratch	n) the ability of a material to resist fracture
15) toughness	o) to cut the surface of

³⁴ Quizlet Study Set: Cleaning Glass and Acrylic Display Cases 1, <https://quizlet.com/695484057/cleaning-of-glass-and-acrylic-display-cases-1-flash-cards/?funnelUUID=707e9c79-04e0-40cc-8864-8a04ef4f4477>. Pristupljeno 16. svibnja 2022.

3. Visual glossary³⁵

display case	glass box in which things are on display, shown	
transparent	Allowing light to pass through	
abrasive	rough; coarse; harsh	
crazing	A network of fine lines in a glaze	
shallow	not deep	
laborious	not easy, requiring hard work	
tempered glass	glass that is strengthened by introducing stress through rapid heating and cooling of the glass surfaces	
frame	The lines and borders that contain the panels	
static electricity	the accumulation of excess electric charge on an object	

³⁵ Quizlet Study Set: Cleaning Glass and Acrylic Display Cases 2, <https://quizlet.com/695486548/cleaning-of-glass-and-acrylic-display-cases-2-flash-cards/?funnelUUID=bbc09012-537b-453e-83dc-6e6a6e-264ba0>. Pristupljeno 18. svibnja 2022.

grease	a substance such as oil or fat	
kit	equipment	
shock	blow, hit, impact	
Lint-free cloth	Used to clean different components without scratching or leaving debris	
adhesive tape	sellotape	

4. Grammar

Modal verbs with passive voice

The sentences from the text below are in passive voice. With modals the passive is formed with **be + past participle** or **have been + past participle**.

4.1 Change the sentences into active voice. Introduce the subject (e.g. we, one) where necessary.

1. Grease stains and traces of self-adhesive backing **can be removed** from acrylic sheet with kerosene or naphtha.

2. Very shallow scratches **can be removed** from acrylic sheet with fine abrasives.

3. Pre-polishes for automotive finishes **can be used** if the scratches are minimal.
-
4. However, with most display case applications, there are attached components that **may be affected** by water, solvents, acids, or alkalis.
-
5. For example, the framing of glass panels **may be made** with wood mouldings or aluminum sections, either of which might be damaged by excessive application of wet cleaners.
-
6. Grease and adhesive tape stains **can be removed** from glass with kerosene or naphtha, but stronger solvents such as acetone can also be used without risk.³⁶
-

Comparison of adjectives

Study the following sentence.

Glass is heavier and less flexible than plastic sheet.

POSITIVE	COMPARATIVE	SUPERLATIVE
heavy	heavier	the heaviest
heavy	less heavy	the least heavy
flexible	more flexible	the most flexible
flexible	less flexible	the least flexible

³⁶ Canadian Conservation Institute (CCI) (1996) Cleaning Glass and Acrylic Display Cases 1/2, <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/cleaning-glass-acrylic-display-cases.html>. Pristupljeno 6. lipnja 2022.

4.2 Complete the table below with comparatives and superlatives of the following adjectives from the text.

POSITIVE	COMPARATIVE	SUPERLATIVE
transparent		
available		
adhesive		
shallow		
laborious		
discrete		
resistant		
tough		

4.3 Write 5 sentences of your own comparing the characteristics of glass and acrylic materials.

5. Watch the video *How to Safely Display Your Collection* on the following page.³⁷

Video link: <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>

³⁷ State Library of Queensland, Caring for Collections: How to Safely Display Your Collection, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 12. kolovoza 2022.

5.1 Complete the sentences from the video with the missing words.

A well-insulated room away from sources of moisture heat and direct light will provide a stable environment for your _____.

Remember sunlight, fluctuating temperatures, heat and high humidity can cause _____ damage to your collection.

Using safe handling techniques look over your collection noting any weak points or potential display _____.

Some display options include _____ and cradles to support book spines, card beneath documents for an extra layer of protection, _____ and padded hangers for textiles and stable mounts for your objects.

You can also use archival mount board, reversible hinges and museum glass or acrylic sheeting for framing to reduce damage from light and _____.

Units made from wood or containing plastics, _____, rubber or wool linings can be harmful to your collection and will need to be retrofitted.

Alternatively, you can make a display plinth or box using _____ materials.

A no food or drink policy is worth considering and having a regular cleaning routine will help protect your collection from dust, _____ and pests.³⁸



6. Additional Practice Tests:

<https://quizlet.com/695486548/test>

<https://quizlet.com/695484057/test>

³⁸ State Library of Queensland, Caring for Collections: How to Safely Display Your Collection, <https://www.slq.qld.gov.au/how-do-i/preserve-your-collections/caring-collections>. Pristupljeno 14. kolovoza 2022.



WOOD AND FURNITURE³⁹

As with many objects that were or still are functional, antique furniture and other wooden objects in decorative arts collections within museums or in private hands require special care.

Items of furniture are often complex structures that are comprised of different materials each with their own conservation needs. Such materials could include metals, textiles and other upholstery, leather, plastic, glass, ceramic, ivory and metal leaf. Understanding the composition of different kinds of wood, finishes, stains, paints and other materials on furniture and wooden objects can provide the best care.

Types of deterioration

Wood is composed of cellulose, a hygroscopic organic material, meaning it has an affinity for water. It is very susceptible to reaction when exposed to fluctuating levels of temperature and relative humidity.

Low relative humidity (dry air) results in wood drying and shrinking. High relative humidity (damp air) introduces dampness to wooden objects which in turn causes them to expand. When an environment changes rapidly, complex objects such as items of furniture may not be able to withstand the repeated contracting and expanding and results in splitting or cracking.

Exposure to ultra-violet radiation in light can cause discolouration to wooden objects and furniture, and disintegration to other organic materials containing dyes such as textiles. Exposure to light can turn light woods dark, and conversely, bleach dark woods. Light can also cause brittleness or discolouration to the painted, stained or varnished layers on furniture.

As with other organic materials, wood is particularly susceptible to insect damage. Pests such as wood boring insects are attracted to certain kinds of timber and damp conditions can also encourage mould growth.

The functionality of furniture means they are often subject to mishandling or gradual wear and tear over time. Loss of parts, breakage and wearing down of structural components is a common result of usage in furniture. Dirt, stains and minor spills from water that result in cloudy patches on furniture demonstrate damage but also show the history and usage of items of furniture.

³⁹ Australian Institute for the Conservation of Cultural Material (AICCM) Wood and Furniture, <https://aiccm.org.au/carer-guide/wood-and-furniture/>. Pristupljeno 10. lipnja 2022.

Treatment

Maintaining a stable environment without fluctuations in temperature or relative humidity and without direct exposure to light is an important step in preserving furniture and other wooden objects. If an environment is stable in relative humidity (between 40-60% relative humidity), wooden objects will not dry out and subsequently will not require oiling or waxing.

Inspecting furniture and wooden objects for signs of insect activity can be done by examining the insides of wooden components of furniture such as drawers and beneath linings for frass or exit holes that insects might leave. If insect activity is observed, isolate the furniture by wrapping in plastic and consulting a pest expert or a conservator is necessary.

Cleaning of furniture and wooden objects should be done with a clean, dry duster on large surfaces, or using fine brushes to dust intricate surfaces.

Metal components of furniture should be buffed with a clean, dry cloth. Commercially available products for metal and for furniture can leave residues over time and have unwanted effects.

Damage caused by mishandling or moving can be avoided by taking care when shifting furniture and assessing the strongest and weakest part of the object.

Conservators who specialise in furniture and other wooden objects are able to identify the requirements of different kinds of wood and materials that are found in furniture from different times. Furniture that needs repair or extensive cleaning should be referred to a conservator in order to achieve the best possible outcome.



1. Reading comprehension

1.1 After reading the text *Wood and Furniture*, answer the following questions.

1. Why are items of furniture often considered to be complex structures that require special care?
2. Which materials can be found on furniture and wooden objects?
3. What is wood composed of?
4. What are hygroscopic materials?
5. How does wood react to low relative humidity and how does it react to high relative humidity?
6. Name all consequences of exposure of wood to ultra-violet radiation?
7. What kinds of pests are attracted to wood?

8. What kinds of damage can appear on furniture as a result of usage and mishandling?
9. What is meant by stable environment suitable for preservation of furniture and other wooden objects?
10. Describe the signs of insect infestation on furniture and wooden objects!
11. What is the correct maintenance of metal components of furniture?
12. How can damage caused by mishandling or moving be avoided?

1.2 Fill in the blanks.

Disintegration, mould, dampness, boring, susceptible, brittleness, withstand, shrinking, affinity,

Wood is composed of cellulose, a hygroscopic organic material, meaning it has an _____ for water. It is very _____ to reaction when exposed to fluctuating levels of temperature and relative humidity.

Low relative humidity (dry air) results in wood drying and _____. High relative humidity (damp air) introduces _____ to wooden objects which in turn causes them to expand. When an environment changes rapidly, complex objects such as items of furniture may not be able to _____ the repeated contracting and expanding and results in splitting or cracking.

Exposure to ultra-violet radiation in light can cause discolouration to wooden objects and furniture, and _____ to other organic materials containing dyes such as textiles. Exposure to light can turn light woods dark, and conversely, bleach dark woods. Light can also cause _____ or discolouration to the painted, stained or varnished layers on furniture.

As with other organic materials, wood is particularly susceptible to insect damage. Pests such as wood _____ insects are attracted to certain kinds of timber and damp conditions can also encourage _____ growth.⁴⁰

⁴⁰ Australian Institute for the Conservation of Cultural Material (AICCM) Wood and Furniture, <https://aiccm.org.au/carer-guide/wood-and-furniture/>. Pristupljeno 13. lipnja 2022.





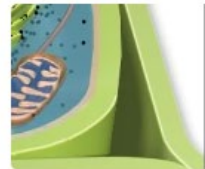





2. Vocabulary⁴¹

2.1 Match the words on the left with their synonyms or definitions on the right.



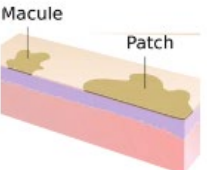





comprise	a mark or discoloration
wood finishes	later on; at a later time
stain	a box-shaped storage compartment
affinity	to include or contain, to consist of
shrink	to pour out accidentally
expand	to draw together, to reduce in size
withstand	material that covers the inner surface of something
contract	increase in size
bore	to cover (something) by folding a piece of material around it
mishandling	decrease in size, range, or extent
wear and tear	to drill a hole
spill	change position or place
subsequently	stand up against; resist
drawer	damage resulting from use
lining	to polish, to burnish
wrap	these are applied to wood for its protection and to enhance grain structure
intricate	remainder
buff	an attraction to
residue	managing or dealing with (something) wrongly or ineffectively
shift	complex

⁴¹ Quizlet Study Set: Wood and Furniture 1, <https://quizlet.com/706436601/wood-and-furniture-flash-cards/?funnelUUID=b0211e72-de04-467a-ac93-3d149799946d>. Pristupljeno 13. lipnja 2022.

3. Visual glossary⁴²

upholstery	the materials used to cushion and cover furniture	
leather	a material made from the skin of an animal	
cellulose	A substance (made of sugars) that is common in the cell walls of many organisms	
hygroscopic	Absorbing moisture readily.	
ivory	hard white material made from elephant tusks	
dampness	state of being a bit wet or moist	
varnish	paint that provides a hard glossy transparent coating	
timber	the wood of trees cut and prepared for use as building material	

⁴² Quizlet Study Set: Wood and Furniture 2, <https://quizlet.com/710077492/wood-and-furniture-flash-cards/?funnelUUID=86476da5-da24-402a-8d9b-945e78750cf2>. Pristupljeno 17. lipnja 2022.

split	divide	
discolouration	When plant tissues are the incorrect colour	
patch	a flat, discolored area	
frass	Insect feces	
disintegration	a separation into parts or fragments, disunity, decay	
dyes	pigments that dissolve in liquid	
bleach	a chemical compound used to whiten or make lighter, such as hydrogen peroxide or sodium hypochlorite	
brittleness	The tendency to crack or break	



4. Grammar

Prepositions are words used to connect nouns, pronouns or phrases to other words inside a sentence. They can also form phrases when used as dependent prepositions which means that they follow certain verbs, nouns and adjectives. In the sentences below prepositions form phrases with verbs, nouns and adjectives and consolidate their meaning.

4.1 Fill in the blanks with one of the following prepositions to create meaningful sentences.

to, with, by, of, in, down, for

1. He was once a scientist who specialized _____ human evolution.
2. In order to find the answer to the following question, we were referred _____ the national court.
3. The recent developments confirm the significant fluctuation _____ the gas price level in Europe.
4. This kind of argument based on research is a step _____ the right direction.
5. Three samples have been inspected _____ signs of early decay.
6. Finally, they apply furniture polish or shoe polish and buff it _____ a shoe brush to make it shine.
7. The police have found skid marks caused _____ braking when writing a report about the accident.
8. Many injuries can be avoided _____ following these precautions.
9. Computer software is comprised _____ operating system programs.
10. The new chemical was composed _____ molecules having one carbon, two chlorine, and two fluorine atoms.
11. She tells me she has quite an affinity _____ cats. I think they are master manipulators.
12. It's a good thing I'm not as susceptible _____ criticism as I used to be.
13. The skin of the face is more exposed _____ damaging effect of the environment, such as UV radiation and pollution.
14. The combustion of trees in forest fires results _____ the emission of CO₂.
15. When we arrived in Brazil, we were introduced _____ the Portuguese language.
16. We should avoid exposure _____ natural and artificial sources of radiation.
17. The virus appears to be attracted _____ infrared radiation.
18. These systems shall be subject _____ internal quality inspections.
19. How many feet does it take to wear _____ a step?
20. And what, _____ turn, does the Bible tell us about science?

4.2 The following IF clauses type I can be found in the text. Transform each of them into IF clauses type II and type III. Translate all sentences into Croatian.

If an environment is stable in relative humidity (between 40-60% relative humidity), wooden objects will not dry out and subsequently will not require oiling or waxing.

Type II

Type III

If insect activity is observed, we will isolate the furniture by wrapping in plastic and consulting a pest expert or a conservator is necessary.⁴³

Type II

Type III

⁴³ Australian Institute for the Conservation of Cultural Material (AICCM) Wood and Furniture, <https://aiccm.org.au/carer-guide/wood-and-furniture/>. Pristupljeno 16. lipnja 2022.

5. Watch the video [A Renaissance Cabinet Rediscovered - YouTube](#).⁴⁴

5.1 After watching the video, answer the following questions.

1. What is dendrochronology?
2. What can tree rings reveal about a tree trunk or a piece of wood?
3. What is the technique known as X-ray fluorescence or XRF used for?
4. What did it reveal about the brass tack found on the cabinet?
5. Why was the tack examined under an optical microscope?
6. What did Getty scientists conclude about the authenticity of the tack?

5.2 Fill in the blanks in the sentences from the video with the missing words.

spectrum, hammered, conclude, replica, composition, layer, targeted, fabrication

A tack that had been made more recently, would probably have been _____ or stamped resulting in a very different crystal structure. The microscope also revealed an interesting _____ on the surface of the tack. To identify the _____ of this surface coating, a scanning electron microscope was used. The upper layer was _____ and analyzed with an electron beam. The _____ produced by the microscope showed that the layer was primarily composed of the element tin.

As you can see in this _____, the thin layer of tin was used to imitate the shiny appearance of silver. These discoveries about the manufacture and chemical composition of the tacks, enabled Getty scientists to _____ that they are authentic and date back to the _____ of the cabinet in 1580.⁴⁵

6. Additional Practice Tests:

<https://quizlet.com/706436601/test>

<https://quizlet.com/710077492/test>

⁴⁴ YouTube: A Renaissance Cabinet Rediscovered, <https://www.youtube.com/watch?v=3c7kv8SkxTs>. Pristupljeno 3. rujna 2022.

⁴⁵ YouTube: A Renaissance Cabinet Rediscovered, <https://www.youtube.com/watch?v=3c7kv8SkxTs>. Pristupljeno 4. rujna 2022.



WORKS ON PAPER⁴⁶

The conservation of works on paper encompasses a wide range of media and materials, including maps, prints, drawings, watercolours, manuscripts or scrolls, graphic documents on parchment or papyrus and archival material. Many [photographic materials](#) also have paper as a support and feature many of the same types of deterioration, although conservators often choose to specialise in one or the other, or both.

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Causes of deterioration

Inherent to all paper-based objects is sensitivity to light, heat, and humidity. Paper conservators work to minimise damage to collections on paper by controlling light and environmental factors through correct storage and display. Acidity (high levels of pH) may lead to yellowing, brittleness and other kinds of discolouration such as [foxing](#). Different kinds of paper may contain different levels of acidity inherent in the manufacturing process, or may have been introduced to an adhesive or mount that is acidic, a factor that causes the material to become unstable.

Mould is a major concern for paper collections, thriving on even small amounts of moisture. Other pests such as insects and rodents particularly enjoy eating organic cellulose material, along with dust, adhesives and sizes on paper objects that may contain animal-based glues.

Treatments

When damage does occur, paper conservators use a variety of methods to halt deterioration, minimise the aesthetic distraction from damage on a work, and ensure the work can be handled, displayed, stored or digitised.

By researching the materials of a work, including the paper type, adhesive, media and any other materials used, paper conservators use their knowledge to make the most effective treatment decisions.

⁴⁶ Australian Institute for the Conservation of Cultural Material (AICCM) Works on Paper, Works on paper - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 20. lipnja 2022.

Treatments for books and paper objects often include dry cleaning to remove surface dirt. This might incorporate the use of smoke sponges, erasers, brushes and vacuum methods. Mould is often removed through brush-vacuuming. Wet cleaning techniques vary from using simple swabs with purified water, to buffer (pH neutral) solutions, to stronger chemicals to remove more stubborn adhesives or stains.

Backing removal is often required when paper objects have been adhered to a backing board or other object that is causing chemical or physical damage. This process involves mechanical scraping using tools designed to remove layers of a backing gradually in order to free the object.

Washing is similarly common for paper objects that are stained, covered in adhesive or highly acidic. Using a variety of methods, a paper conservator can isolate areas to clean or fully submerge paper objects in solutions that vary from purified water to buffered water in order to clean and return the paper to a neutral pH level.

Lining a paper object is necessary when it is very fragile, contains many tears and requires an extra support for display or handling. Using diluted starch paste, conservators coat the reverse side of a paper object and line it with a suitable conservation-grade paper chosen for its weight, texture and appearance. Paper objects that do not require lining but have tears are treated locally with fine Japanese tissue paper and starch paste.



1. Reading comprehension

1.1 After reading the text *Works on Paper*, answer the following questions.

1. Which media does the conservation of works on paper encompass?
2. Why are photographic materials often included in the above mentioned media?
3. What are the main causes of deterioration of works on paper?
4. What are the potential consequences of acidity?
5. What is foxing?
6. In what conditions does mould thrive particularly well?
7. In which way do pests lead to deterioration of works on paper?
8. When damage to works on paper occurs, what is the goal of conservators and various methods they apply?
9. Name and briefly describe some treatments for books and other paper objects!
10. When is backing removal required and what does it involve?
11. When do paper objects need to be washed?
12. When is lining absolutely necessary and how is it carried out?

1.2 Fill in the blanks.

scraping, gradually, incorporate, swabs, stubborn, adhered, surface, through

Treatments for books and paper objects often include dry cleaning to remove 1)_____ dirt. This might 2)_____ the use of smoke sponges, erasers, brushes and vacuum methods. Mould is often removed 3)_____ brush-vacuuming. Wet cleaning techniques vary from using simple 4) _____ with purified water, to buffer (pH neutral) solutions, to stronger chemicals to remove more 5)_____ adhesives or stains.

Backing removal is often required when paper objects have been 6)_____ to a backing board or other object that is causing chemical or physical damage. This process involves mechanical 7)_____ using tools designed to remove layers of a backing 8)_____ in order to free the object.⁴⁷

⁴⁷ Australian Institute for the Conservation of Cultural Material (AICCM) Works on Paper, Works on paper - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 23. lipnja 2022.







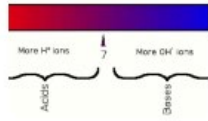

2. Vocabulary⁴⁸

2.1 Match the words on the left with their synonyms or definitions on the right.

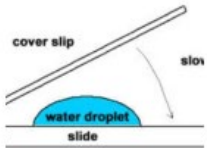


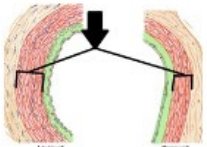





1) to encompass	a) to have something inside
2) to feature	b) existing as a natural part
3) inherent	c) successful in producing a desired or intended result
4) storage	d) little by little
5) display	e) to happen, to take place
6) to contain	f) to combine so as to form one body
7) to thrive on	g) to convert documents into a digital format for a computer
8) to occur	h) to include
9) to halt	i) something that draws attention away
10) distraction	j) to represent a distinctive attribute or aspect.
11) to digitise	k) concerned with beauty or the appreciation of beauty
12) effective	l) keeping safe
13) to incorporate	m) to grow, develop, or be successful
14) stubborn	n) something shown to the public
15) gradually	o) to make (a liquid) thinner or weaker by adding water or another solvent to it.
16) to submerge	p) to make clean and free of dirt or pollutants
17) to purify	q) turning in the opposite direction
18) to coat	r) to stop
19) reverse	s) to cover thoroughly
20) to dilute	t) to put under water
21) tissue	u) any of various gelatinous or glutinous preparations made from glue, starch, etc., used for filling the pores of cloth, paper, etc.
22) aesthetic	v) obstinate
23) size	w) a disposable piece of absorbent paper

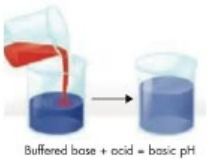




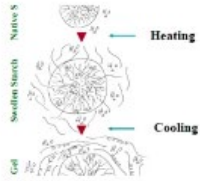


⁴⁸ Quizlet Study Set: Works on Paper 1, <https://quizlet.com/711184231/works-on-paper-flash-cards/?funnelUUID=b8002bfb-14a9-442e-9faf-da3189c277c9>. Pristupljeno 27. lipnja 2022.

3. Visual glossary⁴⁹

manuscript	a handwritten or typed piece of writing, such as a book	
scroll	an ancient rolled manuscript	
parchment	writing material made from the skin of a sheep or goat	
papyrus	Egyptian paper	
heat	high temperature	
humidity	moisture	
acidity	the level of acid in substances such as water, soil...	<p>pH Scale</p> 
foxing	Brown spots due to water stains or fungus	

⁴⁹ Quizlet Study Set :Works on Paper 2, <https://quizlet.com/711416895/works-on-paper-flash-cards/?funnelUUID=48551b67-bf16-4fd7-8b5d-74e68b5b87fa>. Pristupljeno 27. lipnja 2022.

mount	a backing or setting on which a photograph, gem, or work of art is set for display	
adhesive	a substance that unites or bonds surfaces together	
mould	a fungus that produces a superficial growth on various kinds of damp or decaying organic matter	
media	intervening substance	
rodent	an animal with sharp teeth for gnawing	
dry cleaning	a process of cleaning clothes using a chemical solvent rather than water	
eraser	rubber	
vacuum cleaner	a machine that cleans floors and other surfaces by sucking up dust and dirt	
swab	a bit of cotton or cloth used for removing moisture or discharges	

to buffer	to use a compound that prevents sharp, sudden changes in pH	 <p>Buffered base + acid = basic pH</p>
backing board	a board used as a base layer in multi-layer systems	
to scrape	(v.) to scratch; to rub in a rough way	
to stain	to leave a mark on something	
to line	to cover or fill the inner surface of something with some other material,	
starch paste	binder made from corn or potato	
fragile	easily broken	
tear	act of tearing, separating into parts	



4. Grammar

4.1 Find sentences in the text which contain modal verbs. Copy them below and paraphrase them using expressions *it's possible that, possibly, it's probable that, probably, maybe, perhaps* etc. Follow the example.

Acidity (high levels of pH) may lead to yellowing, brittleness and other kinds of discolouration such as [foxing](#).⁵⁰

Acidity (high levels of pH) will probably lead to yellowing, brittleness and other kinds of discolouration such as [foxing](#).

Or

It is probable that acidity (high levels of pH) will lead to yellowing, brittleness and other kinds of discolouration such as [foxing](#).

1. _____

2. _____

3. _____

⁵⁰ Australian Institute for the Conservation of Cultural Material (AICCM) Works on Paper, Works on paper - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 25. lipnja 2022.

4. _____

4.2 Time clauses

When damage **does occur**, paper conservators **use** a variety of methods to halt deterioration, minimise the aesthetic distraction from damage on a work, and ensure the work can be handled, displayed, stored or digitised.⁵¹

Time clauses for the future use the following combination of tenses

MAIN CLAUSE: future simple/present simple/imperative + SUBORDINATE CLAUSE (beginning with *when, as soon as, while, after...*): present simple

1. We _____ (keep) on driving **while** there _____ (be) still daylight.
2. **While** she _____ (be) away, I _____ (try) to sell her house.
3. **As soon as** I _____ (get) on board, I _____ (begin) to have second thoughts about leaving.
4. The baby _____ (cry) **as soon as** he _____ (be) born.
5. **After** I _____ (finish) my homework, I _____ (go) to bed.
6. He _____ (go) home **after** he _____ (finish) his work.
7. _____ (not count) your chickens **before** they _____ (be) hatched.
8. _____ (chew) your food up thoroughly **before** you _____ (swallow) it.
9. _____ (cook) the lentils for 20 minutes **until** they _____ (swell) and _____ (soften).
10. We _____ (play) cards to kill time **until** the bus _____ (come).
11. Always _____ (lock) your car **whenever** you _____ (leave) it.
12. **As you** _____ (approach) the town, you _____ (see) the college on the left.
13. **By the time** she _____ (be) eight, she _____ (be able to) read Greek and Latin.

⁵¹ Australian Institute for the Conservation of Cultural Material (AICCM) Works on Paper, Works on paper - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 28. lipnja 2022.

14. He _____ (keep) the book for me **till** I _____ (come) back.
15. You never _____ (know) how much you _____ (miss) them **till** they're gone.
16. **Every time** I _____ (ask) him about it, I _____ (get) a different answer.

5. Watch the video *Conserving Old Master Drawings: A Balancing Act*, <https://www.youtube.com/watch?v=Qw6NOFJCI8Q> before doing the exercises below.⁵²

5.1 Put the sentences from the video in the correct order.

- Here, a Getty conservator carefully examines a 500-year-old German drawing.
- Next, she examines the drawing under ultraviolet light. The brown spots are called foxing.
- Wearing magnifying lenses, she examines tears and prepares them for mending and reinforcement.
- This solution subtly releases the colour of the foxing, which distracts from the appearance of the drawing.
- They're on paper and hundreds of years old.
- Conserving an Old Master drawing is a balancing act. All drawings have their own set of condition issues that need to be assessed individually.
- This makes it easier to see the marks left by the wires of the paper mold, stains, a watermark, a tear, with a darkened area that shows where it had been previously repaired.
- European drawings from the 1300s to the late 1800s, or Old Master drawings, are particularly vulnerable.
- She uses a small brush to apply an ammoniated water solution to reduce the brown foxing.
- A fundamental role of a museum is to care for its collection and preserve it for future generations
- And at the corner, the shadow of a piece of paper that had been used to attach the drawing to a mount.
- These are marks left by mold.
- Finally, she studies the drawing under a microscope.
- Now the conservator tests the solubility of the ink to ensure it won't bleed during treatment.

⁵² YouTube: *Conserving Old Master Drawings: A Balancing Act*, <https://www.youtube.com/watch?v=Qw6NOFJCI8Q>. Pristupljeno 5. rujna 2022.

- She carefully alternates the application of ammoniated water with that of ethanol in order to reduce tide lines, irregular lines or blemishes left behind as the ammoniated water solution dries.
- She places the drawing on a vacuum table, a device that extracts the liquids used in the treatment out of the paper.
- She first removes the drawing from its mount, or support. She inspects the drawing, lit from below.⁵³

5.2 Fill in the blanks with the missing words.

recedes, fibers, distracts, weighing, humidified, tissue

She takes a piece of Japanese 1) _____ and carefully applies wheat starch paste to mend the tear. Japanese paper has very strong 2) _____, is chemically neutral, and can easily be identified and removed. She allows the paste to set by putting the drawing between blotters and 3) _____ it down with glass blocks and weights. To complete the conservation treatment, the entire drawing is 4) _____ and then placed under weights with blotters to remove the moisture and flatten it. This process extends over a two-week period, and the blotters are repeatedly replaced to facilitate drying. The goal of conservation isn't to make a drawing look new again. Rather, it's to safely reduce the damage that 5) _____ from the design and bring the sheet closer to the artist's original intent. Evidence of age is still present, but now 6) _____ into the background so that you may focus on the drawing.⁵⁴

6. Additional practice tests:

[Test: Works on Paper | Quizlet](#)

[Test: Works on Paper | Quizlet](#)

⁵³ YouTube: Conserving Old Master Drawings: A Balancing Act, <https://www.youtube.com/watch?v=Qw6NOFJCI8Q>. Pristupljeno 6. rujna 2022.

⁵⁴ YouTube: Conserving Old Master Drawings: A Balancing Act, <https://www.youtube.com/watch?v=Qw6NOFJCI8Q>. Pristupljeno 7. rujna 2022.



Unit 8

TEXTILES AND FURNISHINGS⁵⁵

Textiles are produced from a variety of natural or man-made fibres, or a combination of the two, incorporating organic or inorganic materials. Conservators working with textiles have a comprehensive knowledge of fibres, colourants including inks, dyes and pigments and an understanding of design and construction techniques.

Textile conservators work with a wide range of materials and a diverse range of contemporary objects including apparel, costumes, embroideries, furnishings, hats, memorabilia, screen prints, tapestries and other forms of textile art. Textile conservators aim to prevent biological degradation, stabilise the structure of the object or garment while reducing stains and products of chemical degradation.

Causes of deterioration

Most textiles and furnishings are manufactured with a specific function in mind. After long periods of time performing that function – being worn, sat on, folded, stretched, washed and ironed – wear and tear is inevitable. Fibres break, seams give way and natural weaknesses in manufacture can contribute to the physical deterioration of the textile.

Fluctuations in levels of temperature and relative humidity can accelerate deterioration of textiles, and encourage the growth of mould, mildew and insect activity.

Natural and synthetic dyes are often fugitive, meaning these objects are particularly sensitive to moisture and exposure to light. Continuous exposure to ultraviolet radiation will initiate and increase fading and fibre degradation.

Natural fibres are especially susceptible to insects, with moths, carpet beetles favouring wool and silk, and silverfish and rodents preferring cotton and flax.

Treatments

Textile conservation treatments include wet cleaning and dry cleaning, stain reduction, repair, and flattening and lining to stabilise objects.

Brush-vacuuming, using a HEPA filter system and soft brushes works to remove dust that can damage surfaces and attract pests.

Textile conservators working with costumes may construct mannequins or complex 3D sculptural supports for display, and to use when cleaning or repairing them.

⁵⁵ Australian Institute for the Conservation of Cultural Material (AICCM) Textiles and Furnishings, Textiles and furnishings - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 2. srpnja 2022.

The delicate nature of many textiles means correct handling is important: loose threads, failing adhesive and bulky elements make storage and display of textiles particularly difficult.

Textiles should be hung on padded hangers, stored flat or rolled between layers of acid-free tissue in customised tubes.



1. Reading comprehension

1.1 After reading the text *Textiles and Furnishings*, answer the following questions.

1. What are textiles produced from?
2. What kind of knowledge should conservators working with textiles have?
3. Name some materials and objects that textile conservators work with!
4. What are the aims of textile conservators when working with these materials and objects?
5. In what ways does the specific function of textiles contribute to deterioration of textiles?
6. Explain the expression '*wear and tear*'!
7. How do fluctuations in levels of relative humidity and temperature affect textiles?
8. What are the consequences of continuous exposure UV radiation?
9. Name the most common pests attracted to textiles?
10. What are the most common treatments applied to textiles?
11. When do textile conservators use mannequins?
12. Explain the importance of correct handling and display of textiles?

1.2 Fill in the blanks with the missing words.

inevitable, folded, fugitive, seams, manufactured, fading, accelerate, susceptible

Most textiles and furnishings are 1)_____ with a specific function in mind. After long periods of time performing that function – being worn, sat on, 2)_____, stretched, washed and ironed – wear and tear is 3)_____. Fibres break, 4)_____ give way and natural weaknesses in manufacture can contribute to the physical deterioration of the textile. Fluctuations in levels of temperature and relative humidity can 5)_____ deterioration of textiles, and encourages the growth of mould, mildew and insect activity. Natural and synthetic dyes are often 6)_____, meaning these objects are particularly sensitive to

moisture and exposure to light. Continuous exposure to ultraviolet radiation will initiate and increase 7) _____ and fibre degradation. Natural fibres are especially 8) _____ to insects, with moths, carpet beetles favouring wool and silk, and silverfish and rodents preferring cotton and flax.⁵⁶

2. Vocabulary⁵⁷









2.1 Match the words on the left with their synonyms or definitions on the right.

1) comprehensive	a) unavoidable
2) contemporary	b) made especially to suit the user's needs
3) furnishing	c) to intend to do something
4) memorabilia	d) to speed up, cause to move faster; to bring about more quickly
5) to aim to	e) water-based cleaning compounds instead of dry-cleaning chemicals
6) wear and tear	f) furniture, fittings, and other decorative accessories, such as curtains and carpets, for a house or room
7) inevitable	g) to give in, yield, withdraw
8) to give way to	h) a process of cleaning clothes using a chemical solvent rather than water
9) to accelerate	i) objects collected over a period of time that recall particular events
10) fugitive	j) to begin
11) initiate	k) damage resulting from use
12) wet cleaning	l) not tight
13) dry cleaning	m) covering or including everything
14) loose	n) large
15) bulky	o) quick to disappear, fleeting
16) customised	p) current, modern; from the same time









⁵⁶ Australian Institute for the Conservation of Cultural Material (AICCM) Textiles and Furnishings, Textiles and Furnishings - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 7. srpnja 2022.





⁵⁷ Quizlet Study Set: Textiles and Furnishings 1, <https://quizlet.com/713571786/textiles-and-furnishings-flash-cards/?funnelUUID=b48a1e27-0c00-45d8-a969-3f49be334cb8>. Pristupljeno 29. lipnja 2022.

3. Visual glossary⁵⁸

fibre	a material such as cloth or rope that is made from a mass of natural or artificial threads	
ink	a coloured fluid or paste used for writing, drawing, printing, or duplicating:	
apparel	an article of clothing	
embroidery	decorative needlework	
screen print	paint is forced through a screen onto paper or fabric	
tapestry	decorative wall hanging	
garment	a piece of clothing	
fold	bend in layers	

⁵⁸ Quizlet Study Set: Textiles and Furnishings 2, <https://quizlet.com/713573810/textiles-and-furnishings-flash-cards/?funnelUUID=205b4276-6836-4b01-8530-9b94ea6add14> . Pristupljeno 29. lipnja 2022.

iron	smooth (clothes, sheets, etc.)	
seam	joint consisting of a line formed by joining two pieces of textile	
fade	to lose brightness or color	
carpet beetle	coleoptera- holometabolous-chewing- pest	
wool	a fabric made from the hair of sheep	
silk	a soft, light, highly valued fabric made from the cocoons of silkworms	
cotton	The plant that produces fibers from which many textiles are woven. Native to India, it spread throughout Asia and then to the New World.	
flax	plant from which linen is made	

mannequin	life sized statue of a human	
thread	a thin string of cotton, wool, silk, etc. used for sewing or making cloth	
padded	filled with or covered with soft material	
hanger	object on which clothes can be hung	

4. Grammar

Present participle and gerund

- A **present participle** is the form of the verb ending with -ing. It is used as a verb when two actions happen simultaneously, to express a reason or as an adjective.

Seeing his mother, he started to cry.

That **flying** bird is on the verge of extinction.

Knowing that his father had diabetes, he didn't offer him the cake.

- A **gerund** is the form of the verb also ending with -ing and it is used as a noun whereas a present participle acts like a verb or an adjective.

Running with scissors on a slippery floor was a terrible idea.

Sleeping through the night is difficult for me.

4.1 Study the following sentences containing -ing forms of the verb and decide if it is a gerund or a present participle.

- Textiles are produced from a variety of natural or man-made fibres, or a combination of the two, **incorporating** organic or inorganic materials.
- Conservators working with textiles have a comprehensive knowledge of fibres, colourants **including** inks, dyes and pigments and an **understanding** of design and construction techniques.
- Textile conservators work with a wide range of materials and a diverse range of contemporary objects **including**, apparel, costumes, embroideries, furnishings, hats, memorabilia, screen prints, tapestries and other forms of textile art.
- Textile conservators aim to prevent biological degradation, stabilise the structure of the object or garment while **reducing** stains and products of chemical degradation.
- After long periods of time **performing** that function – being worn, sat on, folded, stretched, washed and ironed – wear and tear is inevitable.
- Natural and synthetic dyes are often fugitive, **meaning** these objects are particularly sensitive to moisture and exposure to light.
- Continuous exposure to ultraviolet radiation will initiate and increase **fading** and fibre degradation.
- Natural fibres are especially susceptible to insects, with moths, carpet beetles **favouring** wool and silk, and silverfish and rodents **preferring** cotton and flax.
- Textile conservation treatments include wet **cleaning** and dry **cleaning**, stain reduction, repair, and **flattening** and **lining** to stabilise objects.
- Brush-**vacuuming**, using a HEPA filter system and soft brushes works to remove dust that can damage surfaces and attract pests.
- Textile conservators **working** with costumes may construct mannequins or complex 3D sculptural supports for display, and to use when **cleaning** or **repairing** them.
- The delicate nature of many textiles means correct **handling** is important: loose threads, **failing** adhesive and bulky elements make storage and display of textiles particularly difficult.⁵⁹

4.2 Paraphrase the sentences containing present participles using clauses.

e.g. seeing his mother → when he saw his mother

⁵⁹ Australian Institute for the Conservation of Cultural Material (AICCM) Textiles and Furnishings, Textiles and furnishings - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 11. srpnja 2022.



5. Watch the video Conservation of a 12th-Century Textile - YouTube <https://www.youtube.com/watch?v=wLTagmvGPdw>⁶⁰

5.1 After watching find synonyms or definitions of the following words in monolingual dictionary:

[Dictionary by Merriam-Webster: America's most-trusted online dictionary!](#)

A robe-

A mitre-

A tomb-

A lappet-

An eagle-

To weave-

A stitch-

A fragment-

Fragile-

Reversible-

5.2 Fill in the blanks in the following sentences with the above words. Note that some nouns have to be in plural.

In our collection, for more than a hundred years, we have 1)_____ of the funerary 2)_____ and 3)_____ of King Henry VI who was a German King but who became King of Sicily when he married the daughter of King Roger.

It's his funerary robe and mitre that were actually found in his 4)_____ that is still in the cathedral of Palermo but it was opened in the 18th century.

I was examining it and I realised that the pieces were in the wrong position so we've got this central ribbon which runs down the length of the 5) _____ which have alternating lions and 6)_____ inside the roundels.

They actually kidnapped, let's say imported Byzantine artisans to the island, so from that moment onwards, they could 7)_____ their own textiles.

I've spent a lot of time looking through the microscope to try and see any features that can help me show the positioning of the different pieces when I reposition them, for example 8) _____ holes,

⁶⁰YouTube: Conservation of a 12th Century Textile, <https://www.youtube.com/watch?v=wLTagmvGPdw>.
Pristupljeno 10. rujna 2022.

It was a difficult process because obviously the pieces are extremely 9)_____.

And once the nylon net is secured over the top of the fragments, it's a very 10)_____ way of securing a textile which has got lots of holes in it.⁶¹



6. Additional practice tests:

[Test: Textiles and furnishings | Quizlet](#)

[Test: Textiles and furnishings | Quizlet](#)

⁶¹ YouTube: Conservation of a 12th Century Textile, <https://www.youtube.com/watch?v=wLTagmvGPdw>.
Pristupljeno 11. rujna 2022.



Unit 9

METALS⁶²

Metals come from ores that form naturally in the environment. These ores are smelted and transformed from a stable mineral state to a less stable metallic state.

Most metal objects are made using alloys, a mixture of more than one metal. Combining metals provides certain qualities, strengths and colours. Gold, silver, copper alloy, pewter, tin and iron are found commonly in cultural objects.

Causes of deterioration

Corrosion

Corrosion is the most common form of deterioration affecting metal objects. Corrosion occurs as a result of the unstable metal reacting with its environment causing it to revert to a more stable form.

Corrosion can occur through contact with water, acids, bases, salts, oils (including those secreted by human hands), aggressive metal polishes, gaseous materials (degrading plastics), pollutants (dirt, soot and dust) and various chemicals.

Noble metals – gold and silver – are more resistant to corrosion while base metals, like iron, tin and lead, are highly sensitive to corrosion mechanisms and can become very unstable. Different types of corrosion appear as thin, distinct layers or patina, or large, hard or powdery accretions. Once corrosion has begun the metal object becomes brittle and vulnerable to mechanical damage.

Mechanical Damage

Metals are considered to be strong and resilient though they exhibit weakness and brittleness under certain conditions. Breakages, dents, and scratches from use, accidents, mishandling are common causes of deterioration of metal objects.

Over-polishing of metals gradually grinds away surface layers while chemical cleaning breaks down plating, surface decoration, maker's marks and engravings activating and accelerating corrosion.

⁶² Australian Institute for the Conservation of Cultural Material (AICCM) Metals, Metals - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 15. srpnja 2022.

Treatments

Conservators treat corroded metals using mechanical, chemical and electrical interventions.

Investigative cleaning and X-radiography are useful to identify the metal's condition, its level of deterioration and provide information about surface details, manufacture techniques, and casting flaws.

Specific solutions can remove corrosion after which inhibitors can be applied to protect the surface layers of exposed metal. The process of desalination can be used to remove corrosive salts followed by the application of waxes and acrylic resins as protective coatings to improve object stability.

Conservators use electrolytic cleaning or reduction to reverse the flow of electrons in the galvanic cell, which effectively converts corroded areas to a more stable or easily removed form of accretion. This technique is commonly used on iron excavated from marine environments, although it is unsuitable for highly corroded metals or as a general surface corrosion cleaning method.

Conservators can stabilise mechanical damage (if no corrosion has occurred) through re-joining breaks; applying surface protectors; by advising on appropriate handling and cleaning; and on the correct storage and display conditions to prevent further deterioration of the piece.



1. Reading comprehension

1.1 After reading the text *Metals*, answer the following questions.

1. Where do metals come from?
2. Which is more stable: metals or ores?
3. What are alloys?
4. Which metals and alloys do conservators encounter most frequently in their work?
5. What is corrosion?
6. What causes corrosion of metals?
7. Explain the difference between noble and base metals! Give examples of each!
8. Describe different appearances of corrosion on metals!
9. Name the most common types of mechanical damage on metals!
10. Which interventions are used by conservators to treat corroded metals?
11. Describe the following procedures:
 - investigative cleaning and x-radiography
 - desalination
 - electrolytic cleaning
 - stabilisation of mechanical damage

1.2 Fill in the blanks with the missing words.

occur, bases, noble, patina, accretions, vulnerable, unstable, affecting, secreted, revert

Corrosion is the most common form of deterioration 1)_____ metal objects. Corrosion occurs as a result of the unstable metal reacting with its environment causing it to 2)_____ to a more stable form.

Corrosion can 3)_____ through contact with water, acids, 4)_____, salts, oils (including those 5)_____ by human hands), aggressive metal polishes, gaseous materials (degrading plastics), pollutants (dirt, soot and dust) and various chemicals.

6)_____ metals – gold and silver – are more resistant to corrosion while base metals, like iron, tin and lead, are highly sensitive to corrosion mechanisms and can become very 7)_____. Different types of corrosion appear as thin, distinct layers or 8)_____, or large, hard or powdery 9) _____. Once corrosion has begun the metal object becomes brittle and 10)_____ to mechanical damage.⁶³



2. Vocabulary⁶⁴

2.1 Match the words on the left with their synonyms or definitions on the right.

a)

1) To smelt	a) able to return to an original shape or form; able to recover quickly
2) alloy	b) existing as or having characteristics of a gas
3) to occur	c) to fall back into an old condition
4) to revert	d) slow growth in size or amount
5) to secrete	e) consisting of fine particles or resembling powder
6) gaseous	f) a mixture of two or more metals
7) pollutant	g) to melt in order to get the pure metal away from its waste matter
8) resistant	h) having the ability to fight against

⁶³ Australian Institute for the Conservation of Cultural Material (AICCM) Metals, Metals - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 19. srpnja 2022.



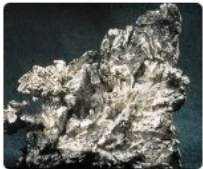

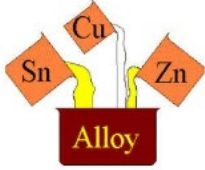



⁶⁴ QuizletStudySet:Metals1, <https://quizlet.com/714687242/metals-flash-cards/?funnelUUID=0989b08f-f7ef-4b1a-942e-9c58b6465a36>. Pristupljeno 25. srpnja 2022.

9) noble metals	i) a material found in air, water, or soil that is harmful to humans or other organisms
10) base metals	j) open to attack
11) powdery	k) to produce and release substance
12) accretion	l) easily broken; not flexible
13) brittle	m) to happen, to take place
14) vulnerable	n) metals at the top of the activity series such as copper, lead, zinc, and tin
15) resilient	o) metals at the bottom of the activity series such as gold, platinum...



b)

1) to exhibit	a) a technique for imaging a core by moving a source of X-rays along the core
2) mishandling	b) gaining of electrons
3) to grind away	c) managing or dealing with (something) wrongly or ineffectively.
4) to accelerate	d) proper
5) investigative	e) to make something gradually smaller or smoother through use or contact over a long period; wear away
6) X-radiography	f) the action or fact of moving along in a steady, continuous stream
7) inhibitor	g) to change from one form to another
8) desalination	h) designed to find information or ascertain facts
9) to flow	i) to show, display
10) reduction	j) a substance that slows or prevents a reaction
11) to convert	k) a process of removing salt from ocean water
12) to excavate	l) a thin coating of gold, silver, or other metal
13) appropriate	m) to speed up
14) to cast	n) to dig out of the ground and remove
15) plating	o) to pour molten metal or similar material in a mould

3. Visual glossary⁶⁵

ore	a rock that contains a large enough concentration of a mineral making it profitable to mine	
gold	Au	
silver	Ag	
copper	Cu	
alloy	A mixture of two or more metals	
pewter	a tin and lead mixture	
iron	Fe	
lead	Pb	

⁶⁵QuizletStudySet:Metals2,<https://quizlet.com/714688592/metals-flash-cards/?funnelUUID=e1e64eda-8e22-4f3c-9f7d-f69d4f24943a> . Pristupljeno 25. srpnja 2022.

acid	a substance having a pH of less than 7	
base	a substance having a pH of more than 7	<p>pH Scale</p> 
polish	a smooth glossy surface , a luster	
soot	black powder in smoke	
patina	a green, black, or brown layer that forms on the surface of some metals often being protective	
dent	a slight hollow in a hard even surface made by a blow or pressure	
engraving	Art form in which an artist etches a design on a metal plate with acid and then uses the plate to make multiple prints	
flaw	a slight fault, defect, crack	

wax	a sticky yellowish mouldable substance secreted by honeybees, beeswax	
acrylic resin	Plastic type of material	
galvanic cell	a device in which chemical energy is changed to electrical energy	
electrolysis	A process by which an electric current breaks chemical bonds	

4. Grammar

4.1 Fill in the blanks in the text below with the missing verbs from the text *Recognizing Active Corrosion*⁶⁶.

is, will retain, must be taken, could contribute, are found, to identify, can reveal, can be, protects, has, is considered, occurs, can initiate, will remain, forms, may be (2x), are applied, causes, are discussed, are considered

Metal corrosion 1)_____ active or inactive. Some objects 2)_____ corroded but stable, and therefore inactive; others 3)_____ actively corroding. An important part of preventive maintenance of metals 4)_____ to recognize the early stages of destructive, active corrosion. Very few shiny metal artifacts 5)_____ in that condition. Only metals such as gold and platinum 6)_____ a fully metallic or polished surface for a long time.

Inactive corrosion 7)_____ as a stable oxide layer — a tarnish or colour change that slowly 8)_____ on metal artifacts and 9)_____ the underlying surface. The oxide layer 10)_____ often to be a desirable patina, particularly if it 11)_____ a pleasing appearance. Artificial patinas

⁶⁶ Recognizing Active Corrosion – Canadian Conservation Institute (CCI) Notes 9/1 - Canada.ca

12)_____ often to the surface of a metal object to protect it and change its appearance. Artificially patinated surfaces on artifacts 13)_____ mostly on sculptures, medals, weapons, and tools.

By contrast, **active corrosion** 14)_____ a continuing loss of material from the object. Action 15)_____ to slow down or prevent further deterioration.

Examining a collection 16)_____ corroding metal artifacts 17)_____ problems with environmental conditions. High relative humidity (RH) or pollutants 18)_____ many of the corrosion reactions.

Environmental factors that 19)_____ to active corrosion 20)_____ under each metal.

Only the metals most commonly found in museum collections 21)_____ in this Note: iron, copper, copper alloys (such as brass and bronze), lead, silver, pewter, and plated metals.⁶⁷

4.2 Can you identify the tenses used in this text? Are they active or passive?

4.3 What can you conclude about the frequency of tenses used in scientific and academic writing?

4.4 Take each sentence and transform it into a question.

e.g. Can metal corrosion be active or inactive? etc.

5. Watch the video Conserving Bronze: The Lamp with Eros from Vani - YouTube <https://www.youtube.com/watch?v=WSLad3IN6Jc>.⁶⁸

5.1 Fill in the blanks of the transcript with the missing words.

Conserving Bronze: The Lamp with Eros from Vani

torchbearer, hoard, cotton swabs, adorned, burial, patina, hinge, wrapped, alloy, encrusted, casting, pit, spearheads, adjacent

The survival of this spectacular bronze lamp required both its safekeeping in antiquity, and favorable 1)_____ conditions thereafter. It was found in the site of Vani in Colchis, an ancient region known for metalwork in what is today the

⁶⁷ Australian Institute for the Conservation of Cultural Material (AICCM) Metals, Metals - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 23. srpnja 2022.

⁶⁸ YouTube: Conserving Bronze: The Lamp with Eros from Vani, <https://www.youtube.com/watch?v=WSLad3IN6Jc>. Pristupljeno 15. rujna. 2022.

Republic of Georgia. In 2007, archeologists discovered a remarkable 2) _____ of metal objects buried in a rock-cut 3) _____ just outside the city walls of ancient Vani. The lamp was one of four found in the pit, beside a mask of rusted iron 4) _____. There it had survived for more than 2,000 years. The bronze was 5) _____ with burial deposits and rust from the 6) _____ spearheads. The J. Paul Getty Museum collaborated with the Georgia National Museum to study and conserve the lamp which was originally 7) _____ with four figurines of Eroses, the child god of love. A Georgian conservator inspects the lamp to determine the nature and degree of corrosion. An x-ray's examined by a Getty conservator. Radiography reveals the high quality of the bronze 8) _____. A Getty scientist identifies the lamp's composition as an 9) _____ of copper, tin and lead.

This information helps determine the types of corrosion. A test cleaning reveals how well-preserved the surface of the lamp is. The thin, blue-green layer, or 10) _____, formed from contact with soil over a long period. As conservators remove corrosion, the object's shape and details are clarified. They clean with wooden sticks, brushes, 11) _____ and scalpels. In a method called abrasion, the lamp is 12) _____ in plastic, with holes left for areas to be cleaned. The object is then exposed to abrasives which remove the rust caused by the iron spearheads. A scalpel is used to pick up the large, hard pieces of corrosion that remain. Entire spearheads encrusted on to parts of the lamp are eventually removed.

The lamp's lid was stuck open. It's loosened by removing corrosion around the 13) _____. The Eroses figurines, two musicians, a dancer, and a 14) _____, are placed on the lamp according to the archeologist's field notes and photographs. Using a range of techniques to clean and restore the lamp, the conservation process provides us with a clearer sense of the mastery of ancient bronze workers.⁶⁹

5.2 Study the meanings of the missing words in monolingual dictionary

[Dictionary by Merriam-Webster: America's most-trusted online dictionary](#) .

6. Additional practice tests:

[Test: Metals | Quizlet](#)

[Test: Metals | Quizlet](#)

⁶⁹ YouTube: Conserving Bronze: The Lamp with Eroses from Vani, <https://www.youtube.com/watch?v=WSLad3IN6Jc>. Pristupljeno 16. rujna. 2022.



Unit 10

CERAMICS AND GLASS⁷⁰

The conservation of ceramics and glass includes both functional and decorative objects such as jewellery, sculptures, tiles, mirrors, dolls, and chandeliers.

The term ceramics encompasses any type of object that is made out of clay minerals, and can either be fired or un-fired clay. Ceramics are categorised by body type.

In general, ceramics fired at high temperatures have a hard, glassy surface and a securely attached glaze, while low-fired ceramics will have soft, porous surfaces and are prone to poorly attached flaking glazes.

Glass is made from a mixture of ground silica, alkali and calcium, which are then melted together to create molten glass. A variety of forms are created by using different methods, including moulding, slumping and blowing, which are left to slowly cool and harden.

Causes of deterioration

Ceramics and glass are both man-made materials. Thus poor manufacturing methods and material composition can contribute to the deterioration of the clay or glass body.

Glass

Inaccurate proportions of silica, fluxes and stabilizers can weaken glass and make it prone to various kinds of deterioration including exfoliation, pitting, spalling and iridescence.

Weeping can occur when the surface layer of glass is to become cloudy and disintegrated and is caused when water vapour in the atmosphere leaches some of the components from the glass.

Crizzling is characterised by very fine fractures on the surface that to begin with may be un-identifiable to the naked eye and can result in the glass becoming recognisably cracked and cloudy with fragments peeling away from the surface. Both are particularly common in pre-18th century glass.

Deterioration of glass is most commonly attributed to water. If an object has been in an environment with high water content for a long period of time, or one with high acidic or alkali levels, or has held liquids for extended periods, deterioration in the following forms may occur.

⁷⁰ Australian Institute for the Conservation of Cultural Material (AICCM) Ceramics and glass, Ceramics and glass - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 28. srpnja 2022.

Ceramics

Glazes are particularly prone to problems when firing and can develop microscopic fractures that can cause breakage problems later, or else the glaze shrinks unevenly causing peeling, shivering or scaling of the glaze.

Soluble salts are one of the most damaging forms of deterioration affecting porous ceramic objects. Archaeological objects buried in salty or alkaline soil, submersed in seawater or used to hold salty materials soak up soluble salts. These salts dissolve and re-crystallize as the humidity fluctuates from high to low causing the ceramic structure to be crushed and glazes can flake off and surfaces spall.

Careless or uninformed cleaning of food stains, grease and dirt can cause physical deterioration of ceramic and glass pieces.

Improper handling, shipping, storing or displaying, and the accidental cracks and breakages caused by these, are one of the major sources of deterioration of ceramics and glass.

Treatments

Conservators are trained to assess the ceramic and glass objects, identify areas of concern and evaluate the best course of protection.

Conservators can consolidate surfaces by adding material to replace losses and stabilise and conserve the glass, and/or the glaze.

Conservators can remove soluble salts in ceramics through repeated rinses so that the salt content of the ceramic object is equalised or can provide specific advice on suitable environmental conditions if the object is too fragile to be worked on.

Removal of insoluble salts is best done by mechanical means though chemical treatments are sometimes undertaken.

Complex cleaning methods using acids to remove metal stains or concretions or the use of alkalis for grease and wax removal are undertaken by conservators, as is the repair or infilling of cracks, breaks and loss of glazes using modern conservation grade adhesives or epoxy resins.

Old and brittle glues can be dissolved using appropriate solvents and replaced with more stable alternatives. Staining from metal rivet corrosion (used to repair breaks in the past) can be cleaned while leaving the rivets in place. This is especially important with historic objects as the riveting is considered significant to the history of the object and if professionally done is usually a successful method of stabilising the object.

Conservators can apply surface protectors and advise on how to stabilise environmental conditions that exacerbate deterioration, and suggest best practice for handling, storage and display.



1. Reading comprehension

1.1 After reading the text *Ceramics and Glass*, answer the following questions.

1. What kinds of objects does the conservation of glass and ceramics include?
2. What does the term ceramics encompass?
3. Explain the difference between ceramics fired at high temperatures and ceramics fired at low temperatures!
4. What kinds of problems are glazes on ceramics particularly prone to when firing?
5. Why are soluble salts one of the most damaging forms of deterioration of ceramics?
6. How can careless or uninformed cleaning and improper handling affect ceramics?
7. What is glass made of?
8. Which methods of shaping glass do you know?
9. What are the most common types of glass deterioration?
10. What is weeping?
11. What is crizzling?
12. Explain the role of water in glass deterioration!
13. How can conservators consolidate surfaces on glass and ceramics?
14. Describe the procedure of soluble salts removal from ceramics!
15. How can insoluble salts be removed?
16. When are complex cleaning methods necessary?
17. How can old glues be removed from glass or ceramics?
18. What was the role of rivets in the past? What kind of damage did they cause?

1.2 Fill in the blanks with the missing words.

shrinks, dissolve, flake, fractures, improper, submersed, grease, prone, porous, soluble

Glazes are particularly 1)_____ to problems when firing and can develop microscopic 2) _____ that can cause breakage problems later, or else the glaze 3) _____ unevenly causing peeling, shivering or scaling of the glaze.

4) _____ salts are one of the most damaging forms of deterioration affecting 5) _____ ceramic objects. Archaeological objects buried in salty or alkaline soil, 6) _____ in seawater or used to hold salty materials soak up soluble salts. These salts 7) _____ and re-crystallize as the humidity fluctuates from high to low causing the ceramic structure to be crushed and glazes can 8) _____ off and surfaces spall.

Careless or uninformed cleaning of food stains,9) _____ and dirt can cause physical deterioration of ceramic and glass pieces.

10)_____ handling, shipping, storing or displaying, and the accidental cracks and breakages caused by these, are one of the major sources of deterioration of ceramics and glass.⁷¹

2. Vocabulary⁷²







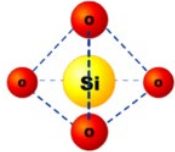

2.1 Match the words on the left with their synonyms or definitions on the right.

1) to encompass	a) incorrect or untrue
2) to attach	b) something lost
3) prone to	c) to wash something in clean water
4) to grind	d) a hard solid mass formed by the local accumulation of matter
5) inaccurate	e) to tie together; to connect
6) to leach	f) to make equal, uniform, corresponding, or matching
7) fracture	g) to encircle, go or reach around; to enclose; to include with a certain group or class
8) to peel away	h) to sink or plunge under water; submerge
9) to shrink	i) to combine, unite; to make solid or firm
10) shivering	j) to mechanically break down a food into a finer texture
11) soluble	k) to decrease in size, range, or extent
12) to submerge	l) susceptible to, liable to
13) to soak up	m) to make worse
14) to assess	n) to dissolve and carry away
15) to consolidate	o) to take off, to move aside
16) loss	p) breakage
17) to rinse	q) to evaluate
18) to equalise	r) tiny flakes of glaze peeling off edges of ceramic ware.
19) concretion	s) to absorb liquid completely
20) to exacerbate	t) material that fills or is used to fill a space or hole:
21) grade	u) capable of being dissolved
22) infilling	v) scale of moving from tough to fine and smooth



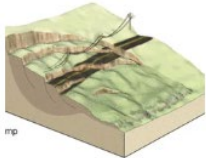




⁷¹ Australian Institute for the Conservation of Cultural Material (AICCM) Ceramics and glass, Ceramics and glass - Australian Institute for the Conservation of Cultural Material (aiccm.org.au). Pristupljeno 30. srpnja 2022.

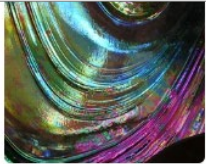





⁷² Merriam-Webster, <https://www.merriam-webster.com/>. Pristupljeno 5. kolovoza 2022.

3. Visual glossary⁷³

jewellery	objects made from gold, silver, and valuable stones that you wear for decoration	
tile	one of the flat, square pieces that are used for covering roofs, floors, or walls	
chandelier	a light fixture that holds many bulbs and hangs from the ceiling	
glaze	a glossy coating	
porous	full of holes; permeable to liquids	
flake	come or fall away from a surface in thin pieces.	
silica	a material found in magma that forms from the elements oxygen and silicon	
alkali	A base that dissolves in water	

⁷³ Quizlet Study Set: Ceramics and Glass, <https://quizlet.com/715337411/ceramics-and-glass-flash-cards/?funnelUUID=e74a42cd-f0f2-4fb3-8291-c91b81ab2baa>. Pristupljeno 1. kolovoza 2022.

calcium	Ca	Ca^{2+}
molten	made liquid by heat; melted	
mould	shape or form	
slump	a type of movement in which glass is pulled down into a mould by gravity	
blowing glass	inflating molten glass with aid of a blow pipe	
exfoliating	When the outer layers crack and break off	
pitting	marking with tiny indentations	
spalling	Delaminating or breaking off into chips and pieces.	

iridescence	surface damage of glass caused by weathering which results in rainbowlike colours	
weeping	Oozing or exuding fluid on glass surface	
crizzling	fine fractures on glass surface	
scaling	tending to crack and come away in thin pieces	
grease	fat	
rivet	a metal fastener	

4. Grammar

4.1 Words to *receive*, a *receipt*, *receptive* are derived from the same root. Following this example complete the table below with the missing words.

VERB	NOUN	ADJECTIVE
		functional
	decoration	
contribute		
	deterioration	
stabilize		
		weak
	identification	
		recognisable
attribute		
		extensive
develop		
	shrinkage	
		solution
damage		
	submersion	
		crystallized
	humidity	
store		
	breakage	
assess		
	evaluation	
		lost
stabilize		
	rinse	
		equalized
treat		
	adhesive	
		replaced
exacerbate		



5. Watch five short videos describing the restoration of a ceramic vase:

Royal Collection Trust: Restoring Porcelain, Part 1 - YouTube <https://www.google.com/search?client=firefox-b-d&q=Royal+Collection+Trust%3A+Restoring+Porcelain%2C+Part+1+-+YouTube#fpstate=ive&vld=cid:dd63be72,vid:P13LXYGyebY>.⁷⁴

Royal Collection Trust: Restoring Porcelain, Part 2 - YouTube. <https://www.google.com/search?client=firefox-b-d&q=Royal+Collection+Trust%3A+Restoring+Porcelain%2C+Part+2+-+YouTube#fpstate=ive&vld=cid:d3688577,vid:k2tUnylfxNI>.⁷⁵

Royal Collection Trust: Restoring Porcelain, Part 3 - YouTube https://www.youtube.com/watch?v=Jr_NZ2Yggil.⁷⁶

Royal Collection Trust: Restoring Porcelain, Part 4 - YouTube <https://www.youtube.com/watch?v=CUIIVUC3HKk>.⁷⁷

Royal Collection Trust: Restoring Porcelain, Part 5 - YouTube <https://www.youtube.com/watch?v=je5-OCJGY5>.⁷⁸

5.1 After watching, put the seven different stages of oriental vase restoration into correct order so that they make a meaningful process.

___gluing with a modern and transparent adhesive

___retouching

___dismantling

___filling of holes and cracks

___removing of glue

___burnishing of glaze

___piecing the vase back together

5.2 Use the vocabulary from the video to describe the process of the restoration of the vase in your own words.

an oriental vase

underglaze blue

on display

⁷⁴YouTube: Royal Collection Trust: Restoring Porcelain, Part 1, <https://www.google.com/search?client=firefox-b-d&q=Royal+Collection+Trust%3A+Restoring+Porcelain%2C+Part+1+-+YouTube#fpstate=ive&vld=cid:dd63be72,vid:P13LXYGyebY>. Pristupljeno 19. rujna 2022.

⁷⁵YouTube: Royal Collection Trust: Restoring Porcelain, Part 2, <https://www.google.com/search?client=firefox-b-d&q=Royal+Collection+Trust%3A+Restoring+Porcelain%2C+Part+2+-+YouTube#fpstate=ive&vld=cid:d3688577,vid:k2tUnylfxNI>. Pristupljeno 20. rujna 2022.

⁷⁶YouTube: Royal Collection Trust: Restoring Porcelain, Part 3, https://www.youtube.com/watch?v=Jr_NZ2Yggil. Pristupljeno 21. rujna 2022.

⁷⁷YouTube: Royal Collection Trust: Restoring Porcelain, Part 4, <https://www.youtube.com/watch?v=CUIIVUC3HKk>. Pristupljeno 22. rujna 2022.

⁷⁸YouTube: Royal Collection Trust: Restoring Porcelain, Part 5, <https://www.youtube.com/watch?v=je5-OCJGY5>. Pristupljeno 23. rujna 2022.

a piece of canvas
animal glue (skin, hoofs, horns)
to oxidize
grease
dirt
a mixture of wax and resin
to dismantle
to reassemble
to soak
a solution
to dissolve
biological washing powder
enzymes
bandages as reinforcement
to fit snugly
an impact (a blow, a hit)
cracks, chips
application of glue with a brush
viscous, gelatinous
putty, the filler
a spatula
translucent
to trowel
a file
abrasive paper (different grades)
to burnish
a tissue
polishing compound
final retouching
ultramarines, indigos, black
a lacquer
surface glaze
background tones, lines, patterns



6. Additional practice tests

[Test: Ceramics and Glass | Quizlet](#)

[Test: Ceramics and Glass | Quizlet](#)

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