BIBLIOGRAPHY – WORKSHOP #3 EXHIBIT DESIGN

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Helpful Conservation Links

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- National Park Service Conserv O'Grams http://www.nps.gov/museum/publications/conserveogram/cons_toc.html
- Smithsonian Museum Conservation Institute http://www.si.edu/mci/english/learn_more/index.html

CHAPTER FOUR

CREATING EXHIBITS: FROM PLANNING TO BUILDING

Eugene Dillenburg and Janice Klein

What Is an Exhibit?

A museum exhibit[1] is, at its most basic, a medium for communicating information, and like all forms of communication, it has its own defining characteristics. Understanding the features that make exhibits different from other forms of communication makes it possible to take full advantage of the unique opportunities a museum provides for presenting information.

Table 4.1. Unique Characteristics of Museums

Museums Are . . .	Good Exhibits Are . . .
Free-choice experiences—visitors decide which exhibits or sections of exhibits they will see	Built for success—make the trip worthwhile by creating situations where the visitor is likely to see the point or complete the task
Physical spaces—visitors walk through and are surrounded by the exhibit	Strongly dimensional—they have objects, props, and other three-dimensional components, and also make use of the total environment, including the visitor path
Open to a broad audience—visitors bring a wide variety of abilities, knowledge and learning styles	Relevant and accessible to the general visitor and support diverse interests and learning styles
Multimodal—exhibits engage different senses (sight, sound, touch) and have different types of expression	Engaged with multiple modalities and take full advantage of the different senses employed during a visit
Nonlinear—visitors do not take a predetermined route, but choose their own path	Clearly organized—the structure of the information is transparent, easy to follow, and can be understood in any order
	Strongly focused—present and reinforce a single clear message
Temporal experiences—the visitor sees different parts of the museum or exhibit over time; however, most visitors have an informal "time budget" and generally spend twelve to twenty minutes in a gallery	Designed so individual components can stand alone, and don't require the visitor to have seen something else first; however, together they create a cumulative effect
Social experiences—visitors often come with family and friends	Designed to accommodate more than one user, designed to encourage conversation and/or group activity

Exhibits serve multiple purposes for museums. They are, first and foremost, a vehicle for informal public education using the objects collected and preserved by the museum, props, interactive devices, and other three-dimensional pieces. However, exhibits also provide an appropriate atmosphere for programming, increase museum attendance and revenues, raise the institution's prestige, and provide a place for social interaction.

In general, a well-structured exhibit is clear, always focusing on a single message. It is organized in a way that makes sense to visitors and helps them understand the content. And finally, the exhibit conveys information not through words on a wall but through objects and experiences in a space.

The process of creating exhibits is often divided into three or more phases, including content development, design, and installation. In larger institutions, these are usually carried out in an overlapping sequence by different members of staff. In smaller museums, however, a single staff member often creates an exhibit from beginning to end. Additionally, smaller exhibits may be developed in a nonlinear form, with modifications made in content or design as the exhibit is installed. For these reasons, this chapter focuses on the activities required to create an exhibit without necessarily placing them in a strict sequence.

Topic

The exhibit process begins with the identification of its topic or focus. There is a wide range of exhibit topics; inspiration may come from the collection itself, upcoming special occasions in the community, or the opportunity to collaborate with another institution. New acquisitions can be used to provide a new or expanded context for older parts of the collection. For example, the Mitchell Museum of the American Indian used the donation of a substantial collection of Northeastern U.S. Indian beadwork as an opportunity to create "Peoples of the Great Lakes," an exhibit that included the museum's extensive basketry collection as well. Similarly, the hundredth anniversary of the birth of the museum's founder allowed it to bring all the objects in the founding collection together from their different locations throughout the galleries.

Since exhibit ideas can come from a variety of sources both inside and outside the museum, one way to ensure the broadest possible input is to create a mechanism for the ongoing or periodic compiling of exhibit ideas. This can range from an exhibit suggestion box to regular community meetings. It is also important to have a formal review system in place to make sure the appropriate criteria are met and to provide a way of saying no. Formal approval of exhibit topics by the director or a board committee is one way to ensure this.

Finally, the exhibit topic should also be in keeping with the museum's mission and fit its interpretive goals for exhibits (see Standards and Excel-

lence Program for History Organizations [StEPs] Interpretation Standard 2 and chapter 1 in this book). In forming these goals, the museum should make sure to include

- a purpose—that is, a broad statement of what the overall exhibits program will achieve;
- a general area of subject-matter focus;
- a general description of the audience the museum wishes to serve;
- a description of what is exhibited (e.g., the museum's own collections or material borrowed from other institutions or from local collectors);
- an enumeration of how many permanent installations there are in the museum and how many are temporary, as well as how often the temporary exhibits change;
- a process—that is, a description of how exhibits are developed, who is involved, and how responsibilities are assigned.

Audience

After settling on a topic, the next step in the exhibit process is defining the audience. No exhibit will appeal to everyone. "Everyone" is not interested in every topic. "Everyone" does not have the same knowledge, skills, and learning styles. The more clearly the audience can be defined, and the more tailored the exhibit is to that audience, the more satisfying the visitor experience will be.

Audiences can be defined in three ways. First, there are demographic factors, like age, sex, ethnic background, income, household size, and education level. Certain topics may be more relevant to specific groups, and certain approaches may be more appropriate for particular audiences. Next, geographic factors revolve around where the audience lives. While small museums predominantly serve their local communities, there may be times when an exhibit is designed to focus on a particular area within that region or, alternatively, to attract seasonal tourists or those visiting from out of town. For example, the Mesa Historical Society developed an exhibit on the Arizona Cactus League for visitors who came during baseball spring training. Finally, psychographic factors include visitors' interests and motivations for attending. Will they be experts or novices on the exhibit topic? Is the exhibit intended for school groups on field trips or families wanting to do something together? Does the exhibit have a strong emotional appeal, perhaps commemorating an event in the town's history, or does it have more interest on an intellectual level?

While not all museums undertake formal visitor surveys, most do know who their regular visitors are. Exhibits can be designed to strengthen the museum's

connection to core visitors or to attract new audiences. Being aware of potential audiences can also provide additional directions for exhibit content or programming. While the Mitchell Museum of the American Indian's exhibit "Winged Messengers: Bird Imagery in Native American Art" focused on objects from a variety of Indian cultures, it also included information for the local bird-watching community and a raptor demonstration.

Visitor studies can help focus the message, content, and design of the exhibit. Research need not be complicated to be helpful. At the Arizona Science Center, a single staff member asking visitors questions over just one weekend found that much of the center's audience for an exhibit on the history of the Phoenix area was relatively new to the region and primarily wanted to know why people would settle in such a hot and dry climate.

Visitor studies can provide an outside perspective to answer questions the exhibit team might have. When planning an exhibit on Pacific coral reefs, some staff at Chicago's Shedd Aquarium wanted to focus on sharks, arguing that this would be of greatest interest to the visitors. Others felt that coral was the center of the ecological story and that sharks were a tangent and should be treated as such. A survey found that visitors had high levels of interest in both sharks and coral (as well as whales and tropical fish). The team realized it did not face an either-or proposition: There was enough visitor interest to keep the exhibit centered on coral and also to justify the inclusion of a significant shark story.

Visitor studies can also affect design. Staff working on an evolution exhibit at the Field Museum worried that visitors would skip past the early sections, which contained the fossils that seemed small and undistinguished to the non-specialist, and head right for the big, flashy dinosaurs. On paper, the designer first planned a winding exhibit path, forcing visitors to slow down in those areas and potentially frustrating them. However, surveys revealed that most visitors expressed interest in those early sections. The designer drew a new floor plan: a straight hall with a series of rooms off it. He felt comfortable providing a clear path to the dinosaurs once he felt assured most visitors would indeed take the time to explore all the rooms.

Observations once the exhibit is in place may also guide your design. A beadwork exhibit at the Mitchell Museum of the American Indian included information responding to two common questions: Where did native people get glass beads, and what did they use before they had them? It soon became clear that the exhibit case containing the information about these topics was in the wrong place, since visitors were often heard voicing those very questions well before they came to the answers. A quick reorganization of exhibit materials solved the problem.

While some of these examples come from larger museums, the same lesson about the value of visitor studies applies to smaller institutions. The best way

to discover your visitors' interests is to listen to them. The exhibit can then be developed to include responses to questions you know visitors already have.

Main Message

The next step is to identify the main message or, as Beverly Serrell describes it in her book *Exhibit Labels: An Interpretive Approach*, the "big idea." This is usually a single sentence that summarizes the exhibit content. It is the visitor's take-home message, and every component of the exhibit should reinforce this point in some way. Even though visitors may only view some components or see them out of sequence, they will be exposed to the main message several times within the exhibit and, through this repetition, may absorb its point. The main message, as written, may never appear in the exhibit, but it should influence every object choice, every label's text, and every design decision.

Serrell recommends that a main message contain a subject, an active verb, and a consequence—for example, "Rocks and minerals reveal clues to our planet's history," where "rocks and minerals" are the subject, what they do is "reveal," and the consequence of that revelation is understanding "our planet's history."
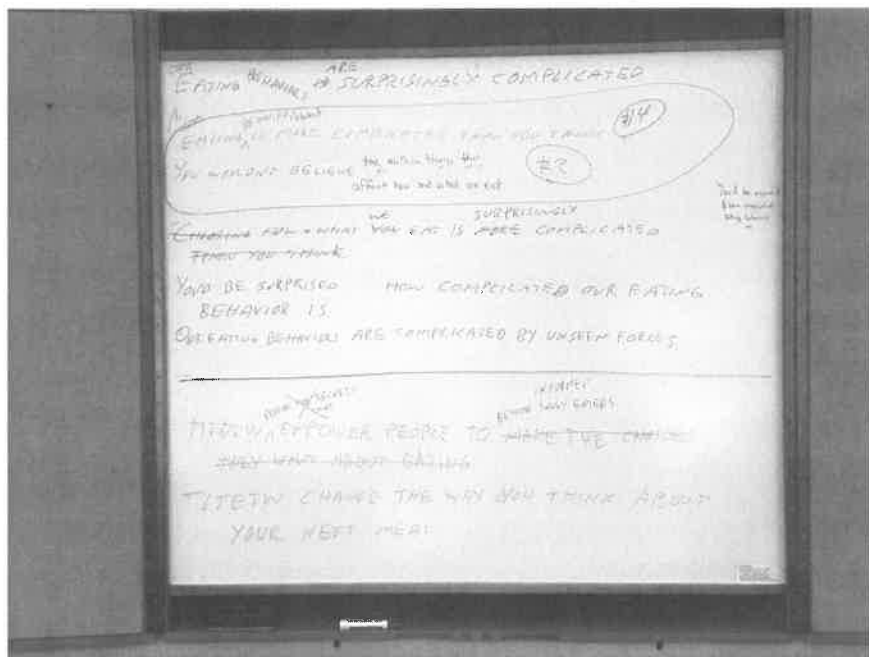
Photo 4.1. A main message brainstorming session, with several versions and a record of the editing and wordsmithing that went on. (Courtesy of Eugene Dillenburg)

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The main message concept is important for two reasons. First, it identifies what to say, where to start, what to emphasize, and where to elaborate. Second, and more importantly, it also identifies what not to say. Any given topic could fill an entire book—in most cases, multiple books. But an exhibit has limited space, limited objects and text panels, and limited visitor time and attention. Focusing on the main message provides a tool to cut away the extraneous material and make the tough in-or-out decisions.

The medium of the exhibit, with its self-directed audience and nonlinear pathways, presents great challenges to clear communication, especially of complex subjects. Unless the exhibit has a good main message, clearly expressed and supported throughout, visitors will be unlikely to understand the point. Instead, they will probably view the exhibit as a room full of random objects rather than as pieces of a coherent story adding up to a single take-home message.

An exhibit without a clear main message is either stuffed to the gills with objects and information, because there was no mechanism for saying no, or a random hodgepodge of miscellaneous items, because there was no theme to tie them together. Either way, it will not communicate clearly, and visitors will get little out of it.

TEXTBOX 4.1

EXAMPLES OF A MAIN MESSAGE

"Sharks are not what you think." (Monterrey Bay Aquarium)
"What is it about dogs that makes us love them so?" (Los Angeles County Museum of Natural History)
"Everything changes, all the time, at speeds too fast or too slow for us to perceive." (Science Museum of Minnesota)
"During the Industrial Revolution, Americans harnessed natural forces and simple machines to build canal systems for transporting goods and materials cheaply." (National Canal Museum)

In each case, these simple statements give a clear indication of what the exhibit will say, how it will say it, what sorts of objects and experiences the visitor can expect, and even the "attitude" the interpretation will take. Each has its own emphasis: The shark exhibit will challenge misconceptions; the dog exhibit will strive to make an emotional connection with the audience; the time exhibit will surprise us; and the canal exhibit will focus on forces and machines as opposed to the many other things it could discuss.

Developing Content

Developing exhibit content includes both intellectual and physical aspects: the story line and the supporting objects, photographs, maps, and materials.

One area that poses difficulties for smaller museums is determining who will be involved in deciding exhibit content. Many books on exhibit development advise consultation with staff, volunteers, community members, and special advisory groups, as well as brainstorming sessions and audience surveys. For a small museum with limited resources, these activities can take more time and manpower than the museum can afford. (Textbox 4.2 describes how to conduct a brainstorming session that includes several people in developing exhibit content.)

It is important, however, to make sure the process is as inclusive as possible (see StEPs Interpretation Standard 3). If the exhibit focuses on a particular part of the community, the perspectives and beliefs of that group should be considered. Accuracy and authenticity are both important (see StEPs Interpretation Standard 4). However, sometimes including more voices in the process increases the likelihood of conflicting views and interpretations. Out of respect for both the participants in the planning process and the audience, it should be clear from the onset who will be making the final decisions (e.g., museum curator, director, project leader). Sometimes strongly held cultural beliefs and oral tradition must be carefully balanced with Western scientific or academic research. For example, in an exhibit on Navajo weaving, the Navajo belief that this group has always lived in the Southwest conflicted with historians' analysis that the Navajo migrated from further north and arrived in the Southwest in the fifteenth century. In cases like this, it is best to identify the source of the information (e.g., "Navajo oral history teaches . . .").

Once a sufficient number of ideas about content has been gathered, whether through formal consultation or informal discussion, a smaller group or single individual can begin to organize them, identifying what materials and ideas seem to go together, what groupings emerge, and what does not seem to fit. This process generally involves a fair amount of negotiating, striking a balance between objects, two-dimensional materials, and interactive components. There will be compelling reasons to include each type of content. However, it is important to remember that no exhibit can include all the information on a topic. The ultimate goal is to provide visitors with a coherent selection of relevant information rather than a dissertation or "book on the wall." Additional materials, including where the visitor can learn more, can be provided through handouts or on the museum's website.

Objects

Objects, of course, are the primary medium through which most museum exhibits communicate. They can be used to tell any number of stories, depending

TIPS FOR DEVELOPING CONTENT

Keep the group small. Having more than four to six people makes it hard to give everyone a chance to be heard, especially if some are reluctant to speak in groups.

Remember that everyone is equal. It can be intimidating to voice ideas in front of everyone, particularly for volunteers or community members. Make sure that everyone understands the rules. Sometimes it helps to have someone other than museum staff run the meeting.

Put the topic and main message up on the wall as a point of reference, but do not limit discussion in any way. Some people may come up with very specific ideas for an object or a point of information they think should be in the exhibit. Others may come up with grand, overarching themes and unifying threads. Both are important and welcome.

Write everything down, no matter how seemingly crazy. Do not worry about relevance, practicality, or even affordability at first. An idea that may initially seem off the wall may, after some discussion, start to make sense. Or it may inspire another, more achievable idea. Most importantly, do not criticize. Criticism kills creativity and erases equality. At this early point, quantity of ideas is more important than quality.

Have a time limit: Forty-five minutes to an hour is about all most people can manage. Do not worry if the perfect idea does not arise. You may want to hold another session or just review all the ideas with a smaller group.

Most important of all, have fun. If you do not enjoy yourself while making the exhibit, how can you expect your visitors to enjoy themselves while viewing it?

on whether the focus is on objects' physical attributes (aesthetic), their context (totemic), or a combination of the two (didactic).

Viewing an object aesthetically focuses on its formal attributes; there is no reference to context or broader meaning. Typically, such discussion emphasizes the appearance, age, or shape of the object. Some art exhibits, like those on classical sculpture or Chinese porcelains, choose to focus on the objects' aesthetic meaning. The exhibit aims to generate an understanding or appreciation of the objects themselves, divorced from any cultural or historical context.

The totemic approach is just the opposite: It is all about context. Within the story line of the exhibit, the object has no particular value in and of itself;

Photo 4.2. Results of a content brainstorming session, with ideas scribbled down onto pieces of paper and tacked up on the wall. Colors coded for different types of experiences: objects, interactives, media, and so forth. (Courtesy of Eugene Dillenburg)

rather, it represents some bigger idea. The classic example is Abraham Lincoln's hat. The hat was mass-produced, a common item for its time. It tells us nothing about the man, other than possibly his hat size. But Abraham Lincoln wore this hat! As a direct, physical link between the visitors and one of the most important figures in American history, it can be used as the starting point for many other Lincoln stories.
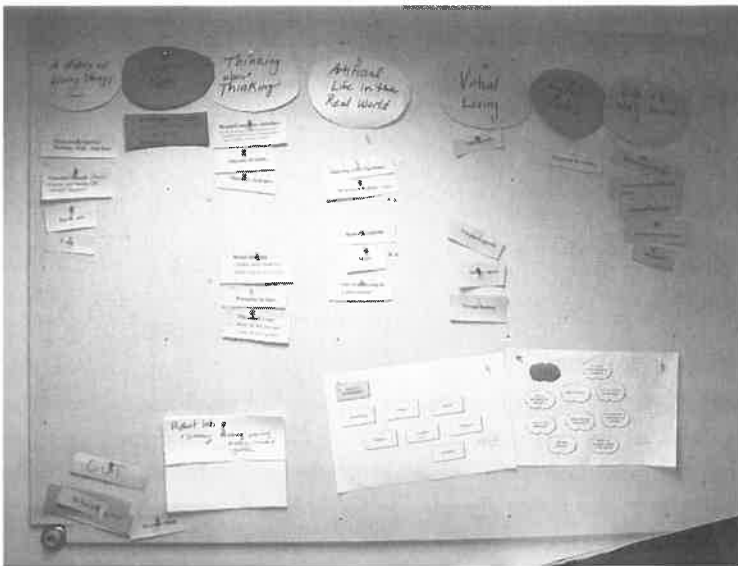
Photo 4.3. After brainstorming, ideas are organized into groups to create a storyline. Notice the "CUT" pile in the lower left corner—very important. (Courtesy of Eugene Dillenburg)

The didactic approach combines these two. Specific physical properties of the object are used as a springboard to discuss more abstract contextual ideas. A dinosaur bone has formal aesthetic properties of shape, size, and contour. These show where the muscles were attached, how big they were, and how the animal moved; thus, they describe the animal's role in the context of its ecosystem.

Of course, a single object may carry more than one of these meanings in an exhibit. For example, many natural history museums display large collections of mounted butterflies, arranged by size or color. This illustrates both the butterflies' visual features (an aesthetic point) and their biological diversity (a didactic point).

Similarly, the same object, in different displays, can mean different things. A stuffed beaver alone in a case is a display about the beaver. Add a woodchuck, and now the beaver is part of a "Rodents of the United States" exhibit. Take out the woodchuck and put in an aardvark, and the message becomes "mammals of the world." That same beaver in a case with a heron becomes "Michigan wildlife."

Two-Dimensional Materials

In addition to their role as objects with distinct individual meanings, two-dimensional materials, such as maps, photos, archival documents, drawings, charts, and diagrams, can provide important supplemental information. Maps are clearly important for exhibits that rely on geographic references, while a good diagram can take the place of paragraphs of explanatory label text.

Photographs can show objects or activities that are too large to fit in a case or even the museum, such as an image of a Hopi woman replastering her adobe home or a Civil War cannon. Photographs can also take the place of objects that may be unavailable or beyond the museum's resources to display properly but that are key to the story line, like an image of a woman in full Victorian dress. Especially effective is the juxtaposition of an object with an image of it in use—for example, a nineteenth-century Winnebago beaded hair wrap next to a photograph of a contemporary powwow dancer wearing a similar piece.

Hands-On, Audiovisual, and Interactive Devices

More and more museums are using hands-on, audiovisual, and interactive devices to engage visitors and support multiple learning styles. Museum objects, for all their glory, can generally only be viewed, not touched or moved. Touchable components engage more of visitors' senses and thus more of their brains.

Nonaccessioned objects or modern-day replicas placed on "touching tables" are the most common and simplest type of hands-on materials. Raw materials, like porcupine quills, buffalo or deer skins, and birch bark, provide excellent

hands-on supplements to exhibits on Native American culture. Samples of local rocks and common fossils do the same for a geology exhibit. Clearly identifying these as noncollection items helps visitors understand that the museum maintains appropriate standards for the care of its collection and does not allow accessioned objects to be handled.

The addition of sound, whether as background music or specially recorded spoken text, is most easily done using a CD player. Short videos can be shown on a repeating loop or restarted by a staff member when appropriate. It is generally necessary to cover the control area of the CD or video player so that visitors are not tempted to change the settings themselves.

Interactive components, which have the visitor do something, like press a button or lift a flap, work best when the activity itself reinforces the message. For example, putting flappers over a picture of the local environment and posing the question "Where do hummingbirds live?" makes lifting the flappers an act of searching, which is exactly what a naturalist trying to answer that question would do. The activity becomes part of the answer.

There is no hard-and-fast formula for when to use an interactive as opposed to some other exhibit device. Two good questions to ask are as follows:

- Is the content important? Of course, everything in the exhibit should be pertinent and relevant. But some things are more central to the story than others. Interactives take time to plan, money to build, and staff to maintain. It is best to focus those resources on the most important points.
- Is this a good way to present this content? Some information is best illustrated through an object, a photograph, or a text panel. It may not be a good fit for an activity, and trying to make it active just for activity's sake will confuse and obscure the point. On the other hand, some ideas are difficult to communicate through static means, especially those that are physically big, conceptually abstract, or dynamic in nature. These are often better suited for an interactive approach.

Interactives do not have to be expensive. Some simple examples include

- graphics mounted on boards that slide past one another;
- overlays printed on acrylic;
- oversize maps laid out on the floor;
- models to put together;
- drawers that open to reveal additional objects;
- mounted magnifying glasses showing detail of small objects.

The Phoenix Museum of History used a miniature wooden wagon and appropriately sized beds, clothes trunks, tools, sacks of flour, and other necessities that would have been taken on the journey West to give visitors the opportunity to decide which of the many objects they would choose to put in the allotted space in the wagon. On a somewhat larger scale, the Tempe History Museum provides bins of plastic vegetables, small wheelbarrows, and wooden crates that allow visitors to "pick" and "pack" typical crops and load them into the back of a 1940s pickup truck. Each of these activities gives the visitor the opportunity to compare, measure, and get perspectives not provided by objects in cases. More ideas and step-by-step instructions for many interactives can be found in the Cheapbook series published by the Association of Science-Technology Centers.

More complex interactives, like touch-screen computers, are generally beyond the skills of small museum in-house staff or volunteers and may require the assistance of outside vendors. Two sources for these vendors may be found at the Museums USA (www.museumsusa.org/vendors) and AAM Marketplace (www.museummarketplace.com) websites.

Whenever possible, an interactive should be tested with visitors before the exhibit opens to see if they understand how to use it and what it means. A cheap model can be made out of cardboard and tape, and the interactive can be easily changed if it does not work.

Research

Exhibit research not only ensures the accuracy of what is said (StEPs Interpretation Standard 4) but can also suggest new ideas and approaches to improve the exhibit. Research on a model of the Roosevelt Dam for an exhibit at the Arizona Science Center uncovered that it was created by a well-known sculptor; use of that fact encouraged visitors to see the model not only as a technical representation but also an art object.

Research on a specific object's provenance will ensure that it comes from the right location, culture, or period. Research may also show that a selected object is not appropriate for the exhibit or that some other item illustrates a content point better. Such changes are common in the exhibit design process and generally result in a richer, more tightly focused story. Depending on the topic and institutional resources, information can come from in-house expertise, external advisors, or reputable published sources. (See chapter 3 in this book for more information on exhibit research.)

Exhibit Organization

The information in an exhibit needs to be organized. Visitors will be unable to make sense out of an exhibit if ideas and objects are presented in a random fashion.

In general, the individual components of an exhibit can be organized by time, by category or theme, or by location. Less commonly, content can also be effectively organized hierarchically (e.g., biggest to smallest) or even alphabetically. An exhibit should be organized by one of these schemes, and one of the most important steps in exhibit development is carefully selecting the scheme that best conveys the exhibit message.

Most history exhibits are organized by linear time, telling the story of a town, county, or other region from its founding up to the present day. Other exhibits present time as cyclical, describing the hours of a day, the seasons of a year, or the steps in a process. For example, "Amazon Rising" at the Shedd Aquarium in Chicago takes visitors from the annual dry season to the rainy season and back again.

However, arranging an exhibit chronologically presents several challenges. First, the exhibit's "present day" soon becomes the past. It is necessary to continually update the exhibit with more recent materials so that it does not become outdated.

Next, while most people easily understand the concepts of before and after, they may not be able to follow a long or complicated story laid out as an exhibit. Many people have trouble keeping time straight on scales longer than a human lifetime. They may understand the distance between "my childhood" and "Dad's childhood" and even "Grandpa's childhood." But the distance between Grandpa and Abe Lincoln or between Lincoln and Shakespeare is harder to gauge. A simple time line can help visitors comprehend exhibits organized this way.

Finally, the purely chronological approach can pose problems when presenting multiple perspectives in the same exhibit. The Bob Bullock Texas State History Museum is organized chronologically but also aims to tell the story of all Texans, including African Americans, Indians, Hispanics, and women. Every period room contains some panel or display about each of these groups. This means that a visitor who is interested in, say, black history in Texas has to go through the entire museum, room by room, looking for the one panel in each that talks about the subject. The content is not all gathered together in one place.

One way to deal with some of the problems of the chronological approach is to organize the exhibit by category or theme. The Minnesota History Center is able to include multiple perspectives in its exhibits by organizing them around themes like work, transportation, music, and weather and comparing the past with the present in each.

The notion of the category, however, has its own challenges. Experts think about their subjects in terms of categories: They divide broad topics into specialties. Museums also generally organize collections by category, often to aid experts in their study. However, the categories used by experts to understand

the world are often very different from those used by the general public. The zoologist sees the mackerel as a fish, the dolphin as a mammal, and the crab as a crustacean. The nonzoologist may simply group all these together under the heading "sea life." It is important that the categories used to organize an exhibit match the visitors' categories, or can at least be easily explained to them. Visitor research or discussion among staff and volunteers can provide insight into generally understandable terminology.

An example in which familiar categories are not used is the American Museum of Natural History's dinosaur halls. One is dedicated to the order Saurischia, the other to the order Ornithischia. While this is a clear paleontological distinction, it is not terribly helpful to the parent whose ten-year-old child wants to see the tyrannosaurus and the triceratops, now in separate rooms. And while most visitors probably understand the difference between birds and mammals, or between warm-blooded and cold-blooded animals, the distinction between artiodactyls and perissodactyls (even- and odd-toed, hoofed mammals, respectively) is not likely to be particularly meaningful to anyone not already a zoologist.

Since an exhibit is a physical space, location can be a particularly powerful method of exhibit organization. Objects and other exhibit components are arranged and arrayed spatially in the gallery. If the story line is also organized spatially, with different information tied to specific real-world locations, then the organization of the display itself carries meaning.

As with time, there are many ways for location to be used in exhibit design. A planetarium or astronomy museum may organize itself as a trip through the universe, the galaxy, or the solar system. Many collections can be organized by world geography, by continents or countries. Regions, states, or neighborhoods in a town can also be used if these are the stories the exhibit aims to present or contrast.

Location can also work well on a smaller, more human scale. Many museums re-create street scenes and organize displays within different types of buildings or businesses. A historic house is naturally divided into rooms. You can get smaller still, "shrinking" your visitor down to explore the human body or the parts of a computer.

Labels

Content

Museums most commonly communicate their messages and interpret their objects through the written word—that is, labels. These are often broken down into four levels:

Table 4.2. Types of Labels

Exhibit or Gallery Label	• Explains the main message
	• Draws the visitor into the exhibit
Section Label	• Used when there is more than one case or component about a specific part of the story
	• Provides an overview of that section of the exhibit
Case or Component Label	• Summarizes the content in an individual case or component
	• Connects to and elaborates on the main message
	• Explains why these objects are grouped together
Object Label	• At its most basic, identifies the individual object with title or name, but can include more detailed information (e.g., date, provenance, and museum catalog number)
	• Provides detailed information or background on a specific object
	• Gives instructions for an interactive device

Headlines—that is, full sentences or phrases with a noun and verb—are commonly used in label writing both to summarize panel content and to encourage the visitor to read the whole text. Since studies have shown that most museum visitors

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TEXTBOX 4.3

SAMPLE CASE LABEL

Dolls, miniatures, and other toys allowed Native American children to learn adult skills as they had fun.

Children's first toys were usually given to them, but once they could carve, sew, and bead, they were expected to make their own playthings. Accuracy was important even in making toys. As children grew older, their craft skills improved so that by the time they were adults, they were able to create full-sized utilitarian objects.

Playing with dolls and other toys also created opportunities for children to interact with each other and increased their socialization skills. Reenacting ceremonies with dolls taught children about tribal traditions. Miniature cradle boards and dolls, tipis, and bows and arrows also allowed children to practice grown-up activities, with boys focusing on hunting and war and girls on domestic skills.

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spend a maximum of twenty minutes in an exhibit, the more succinct a label's message, the more quickly it is delivered, and the more likely the visitor is to absorb it. (See textbox 4.3 for a sample case label with a headline as its first sentence.) Additional information on writing labels can be found in textbox 4.4 and *Exhibit Labels: An Interpretive Approach* (see the resource section at the end of this chapter).

Design

The primary goal of exhibit graphic design is to make the written message legible and accessible. The typeface needs to be easy to read with letters at least one-quarter inch high and considerably larger if the label is to be understood from any distance. (Letter height varies depending on the font, but one-quarter inch is equivalent to a font size of at least eighteen points.) A background color with a high contrast to the type color works best. Many techniques that seem elegant or creative actually result in text that is difficult to read if they are used for more than one sentence. This includes reverse type (light color on dark background), centered or justified (as opposed to flush-left) text, and accents like italics, underlining, and boldface. Lettering on clear acrylic with no background can also be difficult to read or, if poorly lit, may cast shadows on the objects or even on the other lines of text. Even if the wall or case interior is covered with

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TEXTBOX 4.4

TOP FOUR LABEL-WRITING TIPS

Number 4: Keep it short—75 words maximum per paragraph and 150 words maximum per label. One-third shorter is even better, especially for heavily interactive exhibits or those aimed at a younger audience. The tight limit not only increases readership but also helps to keep the focus on your message.

Number 3: Avoid jargon and eliminate fancy words. We are here to communicate, not to show off our vocabularies.

Number 2: Go through the label, and try to change any inactive verbs—is, are, was, were, been, become, has, have, and so forth. Describe the objects and characters as *doing* something rather than sitting around just *being* something. Avoid the passive voice. Instead of saying, "The fossil was buried by a flooding river," write, "A flooding river buried the fossil." (Active voice has the added advantage of almost always being a couple of words shorter.)

But the number 1 piece of advice is this: After each draft, read the label aloud to discover whether it flows well and makes sense. If the person who wrote the label trips over the language, visitors reading it cold for the first time, or reading it to their kids, are guaranteed to have problems.

a pattern, the label background should always be solid. An exhibit of Ghanaian pottery at the Art Institute of Chicago made good use of an exuberant, geometric, African-inspired wall covering, but printing the labels on the same pattern made them almost impossible to decipher.

Various publications and websites provide detailed information about compliance with Americans with Disabilities Act (ADA) requirements for graphics. Additional guidelines can be found in *Standards Manual for Signs and Labels* (see the resource section).

Exhibit and Case Layout

Good exhibit design makes the most of the unique characteristics of a museum identified in table 4.1. Key factors include clear organization and thoughtful utilization of the three-dimensional nature of the space.

Of primary importance is an easy-to-follow story line with each case or component telling a self-contained part of the whole narrative. This allows visitors to take different paths through the exhibit space without confusion. Take into account multiple entrances to the exhibit space as well as any routes visitors generally use. If visitors typically follow one path from one room to another, sequential parts of the exhibit can be laid out along that path. If the exhibit requires a set path, signage or labels can be used to make it clear; visitors should never feel like they have entered at the middle or end of an exhibit.

Try to use the space so that visitors are surrounded by and immersed in the exhibit. Rather than placing cases or components around the perimeter of the room, wherever possible create a path that allows visitors to walk between them. Not all three-dimensional objects need be in cases; some can be displayed on the walls on foam core or other solid backing, protected by an acrylic box or frame. Good exhibit design also needs to comply with ADA requirements, allowing space for wheelchair accessibility and providing clear sight lines for the visually impaired.

The color of the room can set the tone of an exhibit. Bright primary colors create very different effects than light pastels or deep, dramatic shades. Cases painted to blend in with the floor or walls can make a small space look bigger. Walls painted in warm colors (reds and yellows) make rooms seem smaller; cool colors (blues and greens) make them seem bigger.

Individual case layouts should also take advantage of the three-dimensional nature of the space, setting groups of objects at various heights and depths. Evenly spaced objects on a shelf or wall may keep the visitors' attention if the individual items have intrinsic dimensionality and variety, like mineral specimens. However, visitors will quickly lose interest in regular rows of objects of the same size and shape, like stone tools or photographic images. Layouts should strive
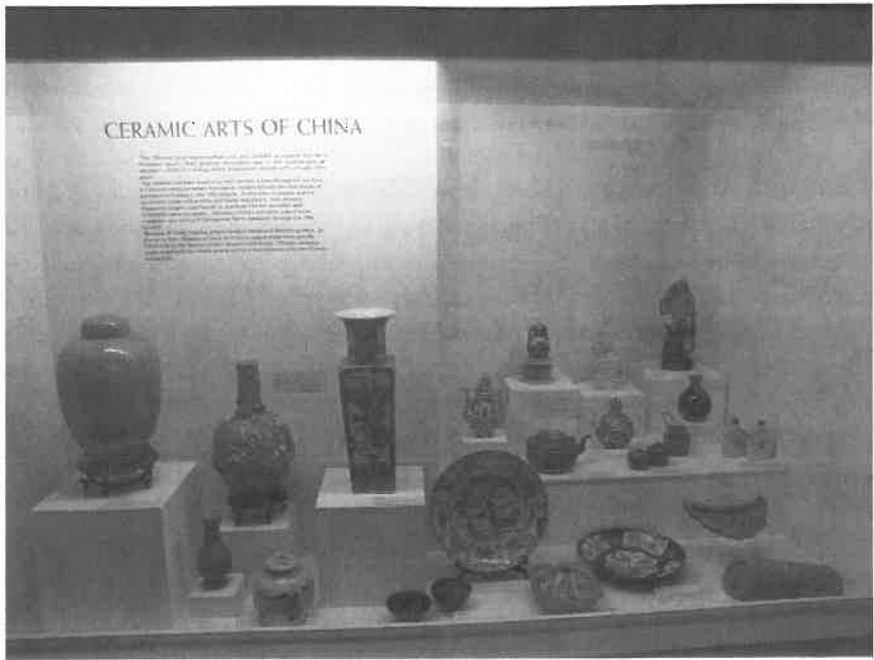
Photo 4.4. Balanced asymmetry. The two halves of this case are not mirror images, yet each side carries the same visual "weight": the three tall vases on the left are balanced by the numerous smaller pieces on the right, with the plate in the center as an anchoring fulcrum. Notice, too, how the designer used the depth of the case, and even added plinths to vary the height of objects, adding visual dynamism. (Courtesy of Eugene Dillenburg)

for "balanced asymmetry," with a large object on one side of the case balanced by several small objects on the other or a large object on a tall pedestal surrounded by smaller objects mounted closer to the base. The asymmetry creates a sense of dynamism and movement, while the balance maintains a sense of order. (See photo 4.4 for an example.)

Different pieces of information can be contained in a single case by grouping closely related items together and using the spaces between the groups to create a visual separation. Alternatively, placing a single object alone in a case draws attention to the object and emphasizes its importance. Focusing on a particularly important, large, or dramatic object, especially at the beginning of an exhibit or in a place easily visible from the entrance, serves to draw visitors into the space. For museums with a large school and family audience, it is important to remember that objects above a certain height will be invisible to many children.

In general, the "less is more" rule works well in museum exhibits. Exhibits should communicate, not overwhelm. A single well-chosen example can be

much more effective and engaging that a dozen nearly identical items. A well-laid-out case leaves space between objects and allows each to shine. Space can also change the visitors' perception of a particular type of object. For example, exhibiting quilts fully opened and spaced out on the walls reinforces their aesthetic value as individual art objects, whereas displaying them folded emphasizes their more familiar role as utilitarian household items.

There are times, however, when a more crowded case can also make a point, such as abundance or diversity. For example, the Northwest Coast gallery at the Field Museum is particularly dense with objects and photographs. While it is the norm for museums of this size and scope to display only 1 to 2 percent of their collections in a given area, the Field Museum has almost 75 percent of its Northwest Coast collection on display. Despite some criticisms that this is overkill, the approach provides a very direct experience of the richness not only of the museum's collection but also of the culture itself.

Within individual cases, the choice of a contrasting background color not only makes the objects more visible but can also support part of the exhibit message. For example, mounting Southwestern Indian silver and turquoise jewelry on purple velvet makes a connection with the clothing that Navajo women traditionally wear with these pieces. Using a different color or fabric for case interiors and mounts in each gallery or part of an exhibit provides a recognizable "signature" for the different spaces. Appropriately patterned fabric can also provide geographic or cultural cues, like a grassy green fabric used in a Great Plains exhibit or a pale blue and white background for Arctic carvings. Of course, it is important for the pattern or background not to overwhelm objects. Finally, for organic materials that are subject to pest infestation, a solid, light-colored background makes it easier to see any insect frass (excrement) or other debris.

In smaller museums with limited time, manpower, and money, it is often impractical to draw detailed layouts of case interiors. However, for particularly complex cases, laying out the exhibit materials on a flat surface the same size and shape as the case allows for experimentation with different layouts. A floor plan showing the location of cases and components and identifying the interpretive materials ensures that everything fits and that no sections get lost. Computer programs like Floorplanner (www.floorplanner.com) and Google Sketchup (http://sketchup.google.com) can assist with creating both two- and three-dimensional designs.

Mounting the Exhibit

At installation time the content and design decisions are tested against the physical reality of the exhibit space. Items may be added or removed, object selection

altered, and changes made in how topics are presented. For example, it may make more sense either for space or content purposes to use a photograph instead of an object. In small museums, which often have less time for exhibit development or design, space or time restrictions may require that sections of the exhibit be reorganized or condensed. Of course, major changes in the size or number of cases or mounts may be costly and time-consuming, so it is important to plan as carefully as possible. With any revision, the ultimate goal remains to present the main message clearly using the available resources of time, money, and manpower.

Most importantly, when exhibiting original objects, be they two- or three-dimensional, make sure they are protected from damage due either to handling by visitors, environmental factors, or the exhibit process itself. (See textbox 4.5 for specific conservation guidelines for exhibits.) Mounts should never be attached directly to objects with any kind of hardware or adhesive.

The method for limiting visitors' access to objects on display will vary depending on the exhibit layout, the nature of the museum, and the type of visitor. For museums with many children and family visitors, cases and frames are the preferable means for protecting original objects. Historic houses or museums with a large number of docents, interpreters, or gallery attendants may rely on ropes or other barrier systems. Of course, exceptions can be made when there is a compelling reason. For example, at the Mitchell Museum of the American Indian, a large number of the visitors are families and children on school tours. Although most objects are displayed inside closed cases, for interpretative reasons it was decided to show a full-sized canoe in the open almost at ground level, "protected" by the volunteer at the front desk. Touching restrictions were explained to visitors at entry. Often the younger visitors paid attention while their parents needed to be reminded, "Dad, the lady said not to touch the canoe!"

Smaller museums generally do not have the resources to create custom cases for each new exhibit but reuse exhibit furniture and materials from one exhibit to another. When there are funds for new case construction, often through grants or special donations, it is best for the case design to be as versatile as possible, perhaps providing vitrines (acrylic lids) of different heights for similar-sized wooden bases. The more specialized the case, the less likely that it can be reused. *Help! For the Small Museum* includes detailed instructions on building simple cases (see the resource list).

Larger museums may be willing to donate unwanted exhibit furniture from their past temporary exhibits. Other recycled cases may come from local stores. If necessary, simple modifications can be made, like building wooden platforms to raise the height of the case or adding wheels to make it more mobile. (See photo 4.5)

The physical exhibit space itself may pose installation challenges. Doors, windows, and even construction materials may require creative solutions. Holes

Photo 4.5.   A base and wheels were added to a donated department store jewelry display case. (Courtesy of Putnam County Museum, Inc., Greencastle, Indiana)

drilled in brick or concrete walls to hang objects are permanent and should only be made after careful thought. Any change in exhibit design may leave the holes as an ugly distraction. Mounting objects directly on walls with painted, paneled, or other finished surfaces may also leave scars that will need to be covered or fixed in the future. Alternatives to drilling into these types of walls include hanging the objects from a wooden railing permanently affixed to the walls or from hooks screwed into the ceiling. The size or layout of the exhibit space can also be modified through simple techniques like building temporary walls from doors hinged together or closing off areas using curtains hung from inexpensive rods.

Appropriate materials and installation techniques for mounts, cases, and frames provide protection and stability for objects and ensure that they do not chemically react with any of the mounting materials. A list of acceptable and unacceptable materials for case construction is listed in table 4.3.

A wide variety of chemically inert plastic mounts, mini easels, risers, and other display items are available commercially. Object mounts can also be made in-house using relatively inexpensive materials. Blocks of inert foam or wood, painted to match the cases or covered with appropriate fabric, can be used to create multilevel platforms.

Objects can be displayed on a slant by tying them to sheets of fabric-covered foam core or heavy cardboard with monofilament (nylon fishing line, commonly sold in hardware stores). Monofilament can also be used to stabilize objects on their mounts, while nails covered with inert plastic tubing can prevent objects from moving inside the case.
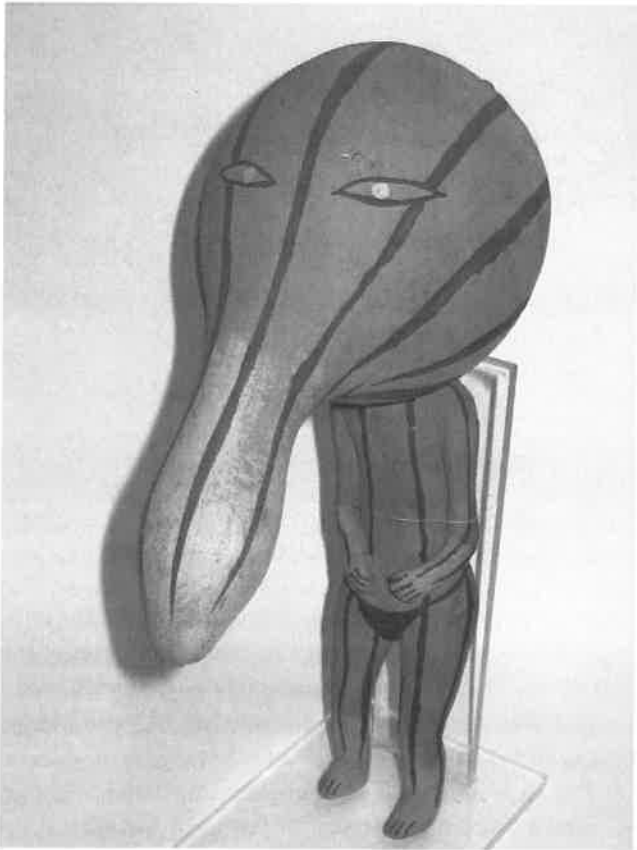
Photo 4.6. Monofilament holds the Squash Kachina to its acrylic base. (Courtesy of Janice Klein)

Table 4.3.   Case Construction

Acceptable	Unacceptable
Case Construction Materials	
Acid-free paper and board	Carpeting
Acrylic adhesive and paints	Drying oil paints
Ceramics	Formaldehyde-containing products
Cotton (undyed)	Formica
Glass	Lead-based paints
Linen (undyed)	Oil-based paints
Metals	Poly-sulphide adhesives
Plexiglas	Polyurethane resins and foams
Polyester fabrics (Dacron, Terylene)	Polyvinyl acetate emulsified resins
Polyester sheeting (Mylar Type D)	Polyvinyl acetate latex-based paints
Polyethylene foam (Ethafoam)	Polyvinyl chloride
Polyethylene plastic sheeting	Rubber derivatives
Sealed woods (see below for woods and sealants)	Sulphur dyes
	Unsealed wood
	Vulcanized rubber
	Wood pulp paper products
	Wool
Wood	
Balsa	Butternut
Birch	Cypress
Exterior Plywood	Douglas fir
Maple	Hickory
Marine Plywood	Oak
Particleboard made without formaldehyde resin	Particleboard/chipboard
(i.e., Medex, Medite II, Resincore I)	Pecan
Poplar	Pressed-fiber board (Homosote)
	Red cedar
	Redwood
	Southern yellow pine
	Sweet chestnut
Wood Sealants	
Acrylic paints (two to three coats)	Alkyd-based paints
Latex urethane acrylic (Benjamin Moore #416)	Lead-based paints
Marvelseal (aluminum/polyethylene foil)	Oil-based paints
Moisture-cured urethanes (non-oil modified)	Oil-modified polyurethanes
Shellac (two to three coats)	Polyvinyl acetate latex paints
Two-part epoxy paints	
Gasketing	
Acrylic felt	Rubber
Brush nylon	Rubber derivatives
Barrier Materials	
Acid-free paper, board, or tissue	Carpeting
Linen (washed and undyed)	Polyurethane foams
Melinex (Type 456 or 516)	Silk
Muslin (washed and undyed)	Wool
Mylar Type D	
Plexiglas	
Polyester fabric	
Tyvek	

*Based on recommendations of Catherine Sease, fellow of the American Institute for Conservation
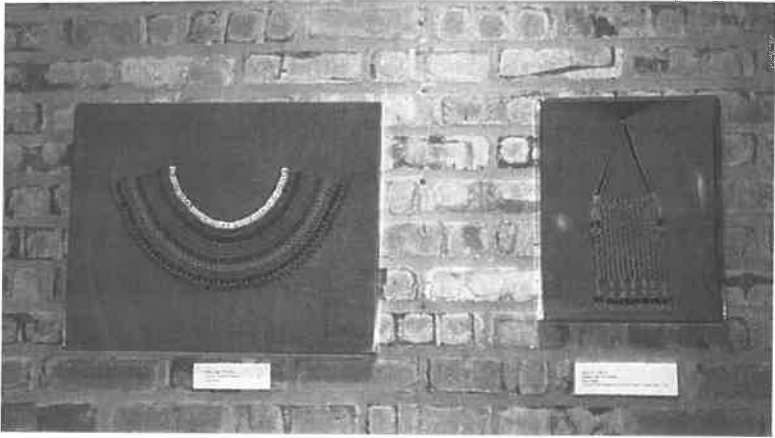
Photo 4.7. Beadwork is mounted inside the modified cardboard box of the acrylic frame. (Courtesy of Janice Klein)

Mini cases for objects with a relatively low profile, like textiles or beadwork, can be made out of plastic box frames by cutting one side off of the cardboard insert provided with the frame. The cardboard can be covered with fabric or another inert material, the object tied to the covered cardboard using monofilament, and the insert slid back into the plastic frame. (See photo 4.7.)

Textiles can be hung by hand-sewing a fabric sleeve made of polyester bias tape or hem facing onto the rear top edge of the textile. A wooden dowel or curtain rod covered with acid-free tissue or lay-flat plastic tubing is inserted through the sleeve. (See photo 4.8.) Monofilament threaded through eye hooks at the end of the dowel allows it to hang from the wall or ceiling using cup hooks or curtain rod brackets. Three-dimensional objects can also be hung using slings of monofilament covered with plastic tubing.

Original two-dimensional materials, like photographs, letters, and other archival materials, require the same care and protection as three-dimensional objects. Displaying them in frames or inside cases is the optimum choice, but in no event should holes be created using any kind of tack or pin. Similarly, original objects should never be attached by glue or other adhesive to a backing or wall.

Display boards made of foam core covered with fabric, similar to those described above, can also be used for two-dimensional objects. Instead of tying the object to the backing, it can be secured using T-pins placed above and below to hold it in place. (See photo 4.9.)

Alternatively, many two-dimensional materials can be easily reproduced by scanning. They can be made any size, using a commercial photocopier. Depending on the overall replacement cost, many of these reproductions can be mounted directly on gallery walls.
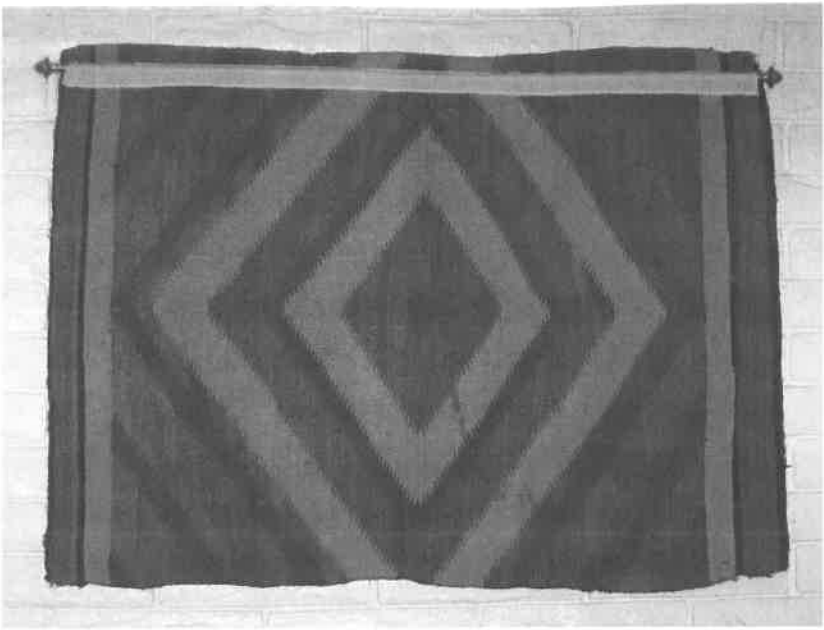
Photo 4.8. The textile is hung by a curtain rod inserted through the cloth sleeve. (Courtesy of Janice Klein)
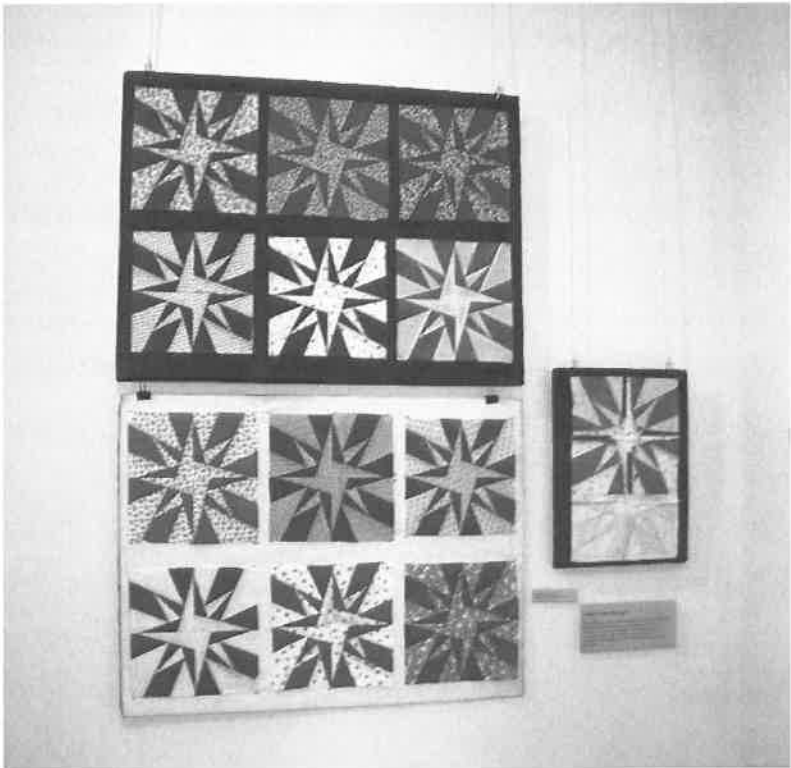
Photo 4.9. Quilt squares are held on fabric-covered foam core by T-pins. (Courtesy of the Montgomery County Cultural Foundation)

There are many techniques for creating and mounting labels, ranging from paper labels to professionally designed and produced banners. While computer-generated paper labels do not have a particularly long life, they are easily replaced and revised. Most word processors come with a wide variety of font faces and sizes. The label can be dry-mounted (a process that uses heat and pressure to adhere paper onto foam core board), glued onto cardstock, backed with colored paper, or framed. If placed inside the case, labels can be laid flat, tented, or placed in acrylic sign holders; outside the case, they can be taped to the wall or side of the case with Scotch Wall Mounting Tabs or mounted in frames.

Remember These Five Guidelines

1. The museum exhibit is a medium for communication with special characteristics. Make the best use possible of those characteristics. Visitor research examines how people behave in museums; whenever possible, make use of those findings.
2. Every exhibit tells a story, but just one story. Not every aspect of a story will fit in the exhibit. There will be more exhibits to tell more stories.
3. Very little in exhibit construction needs to be expensive: reuse, recycle, and rethink. Spend money and time in creating cases and mounts that can be used repeatedly and in different combinations. Ultimately, creativity is more important than money.
4. Do not forget the museum's mission to care for its collection in developing and designing the exhibit. Collection objects on display need special protection.
5. Ideally, an exhibit will be both educational and enjoyable for the visitor. Do not sacrifice one for the other; both are equally important.

EXHIBIT CONSERVATION GUIDELINES

These guidelines are based on the recommendations of Catherine Sease, fellow, American Institute for Conservation. See chapter 1 in Book 6 of this series for more explanation of the causes of deterioration and preservation of collections.

Environment
1. Temperature and relative humidity levels should remain as constant as possible, within a range of 60°F to 75°F and 40–55 percent relative humidity. Heating and cooling systems should not be turned off in the exhibit spaces at night.
2. There should be no natural light in exhibit areas. All windows and skylights should be covered by shades or blinds. Fluorescent lights should be covered by ultraviolet (UV) filters (UF3 or equivalent). Maximum acceptable UV radiation on organic materials is seventy-five microwatts per lumen. Incandescent lights should be mounted outside of cases, at a sufficient distance to avoid overheating the objects. If the surface of an object feels warm, the light is too close.
3. Acceptable light levels:
   • 5 fc (50 lux) for sensitive organic materials, including textiles, dyed leather, paper, feathers, fur, and basketry
   • 15 fc (150 lux) for other organic materials, including wood, undyed leather, bone, ivory, horn, animal skin or hide, and paintings
   • unrestricted for nonorganic materials, including metal, unpainted stone, unpainted ceramics, and glass

Cases
1. Freestanding cases should be adequately weighted with sandbags or affixed to the floor to prevent them from moving when bumped.
2. Exhibit cases and other materials in the case (props) should be constructed of materials that are free of acids and emit the least possible amount of volatile chemicals. All raw wood surfaces should be sealed with paint or polyurethane. All case interiors should be allowed to off-gas (dry in open air) for at least one week, and preferably three weeks, prior to object installation. (See table 4.3 in this chapter for more information.)

(continued)

3. Objects should not be placed in direct contact with wood surfaces, even when they have been sealed. All materials that come in direct contact with the object should be stable. A piece of acid-free paper or thin plastic (e.g., Mylar) can be placed under the object to provide a barrier between the object and any non-acid-free material. Plexiglas, plastic tubing and bags, and muslin, linen, and polyester fabric are also acceptable.
4. No organic material (e.g., wood, leaves) should be placed in the same case as an object.

Mounts
1. Mounts should adequately support the weight of the object and hold it securely without subjecting it to excessive strain.
2. Mounts should never be permanently attached to an object. No wax, adhesive, or pressure-sensitive tape (e.g., double-sided tape) should be used to hold objects in place. Objects should never be tacked, nailed, or stapled to a board, backing, or wall.
3. Clamps and brackets should be padded with nonabrasive, inert material (e.g., plastic tubing, nonwool felt, or moleskin).
4. Objects should not be placed in contact with one another or touch any part of the plastic or glass of a vitrine. To prevent uneven fading, no portion of an object should be covered by another object or any other material.
5. Objects should not be hung by any of their parts, such as handles, loops, or drawstrings, no matter what their original purpose. Objects made of textiles, paper, or barkcloth should not be mounted with sharp folds or pleats.

Resources

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Note

1. The words "exhibition" and "exhibit" are sometimes given different, specific meanings and refer variously to a gallery, a hall, a large installation, or a small display within that larger context (i.e., an individual case, display, or interactive station). "Exhibit" will be used here to include all those meanings.

HELPSHEET

EXHIBITION AND DISPLAY BASICS

ATTACHING

Avoid presenting objects less than 90cm or more than 200cm from floor level (except very long images). Galleries set the 'eye level' for hanging pictures at 155cm above floor level.

Paintings should never be suspended from a single nail (unless very small). They should hang from either two (museum grade) picture hooks firmly fixed to the wall or from two wires suspended from a picture rail.

Light weight graphics, diagrams etc can be fixed to walls or display boards with Velcro adhesive patches.

AVOID Three things to avoid when hanging or installing an exhibition: string, sticky-tape and pins. All are unreliable and unsightly.

LABELS AND SUPPORT MATERIAL

Every object or artefact should be clearly identified with a label. These should be typed (on white or off white), not handwritten, using a clear modern font such as Helvetica Regular, Geneva or Arial in a size of at least 18 points. 1 point 'extended' spacing can be considered for easier reading.

Labels should be set in two sizes, one for general labels and the other for extended labels (the standard labels in most public galleries are 19cm wide by a minimum of 9cm high, with a 1cm margin).

Some galleries place all identifying labels along walls, screens and pedestals so that the top edge of the label is always exactly one metre from floor level.

They can be printed on adhesive backed paper and fixed to cardboard or Fome-cor, before being cut to size.

Labels should be placed to the lower right of the object on the supporting wall, pedestal or plinth with a fixed sight line.

On a dark background, a lot of white labels can dominate the objects. A good test is to squint at the display to see if the labels stand out at the expense of the objects.

If the labels are printed on the same colour paper as the background this problem will be reduced or eliminated.

EXPLANATORY TEXT

Consistency in lettering and design and set in the same font.

No greater than 50 characters wide, or more than 200 words in length.

Free of jargon, unexplained specialist or abbreviated terms.

Expression should be in simple concrete language.

Long words occurring at the end of a line should not been hyphenated, but kept complete and placed on the next line

MOUNTING TEXT OR GRAPHICS
NB The techniques discussed here for mounting and laminating must never be used on archival material or original photos.

There are several backing materials available such as screen board, Fome-Cor and Corflute. These materials can be cut using a sharp craft knife or scalpel and a metal ruler.

To adhere paper to backing:
Spray contact adhesive or rubber cement
Perkins paste avoids paper swelling and wrinkling. This glue is not suitable for resin coated papers commonly used for photographic prints
One of the best materials to use is double sided adhesive paper sheet, or double sided tape
Adhesive Fome-Cor combines the backing board with the adhesive. It is the quick easy and more expensive option.

All these products can be purchased from art suppliers

To protect labels that will be on display for long periods, laminating is relatively inexpensive and will save on replacement costs

CASES PLINTHS PEDESTALS AND PARTITIONS

Should be stable, neat and clean.

Can be a good way of influencing people traffic.

May be necessary to place a heavy weight in the base of a plinth to ensure it is not top heavy.

Display cases should be insect and rodent proof, lined with soft material, inclined towards the viewer and lit so as not to cast the exhibits in shadow.

LIGHTING

No exhibit – especially fabric, a painting, drawing, print or original photograph should be placed where it is in direct sunlight at any time of the day.

Efforts should be made to keep ambient lighting subdued with any windows near exhibits being blocked out or fitted with UV filtering screens for the duration of the display. Recommended light levels for specific objects during display can be obtained by contacting the MA (Vic) office.

Check the lighting of an exhibition. Walk through the space, looking for shadows and any points that may shine into the visitors' faces.

It is always best to light works hanging on walls from an angle, positioning spotlights so that they pan over several exhibits.

The recommended lighting levels for collection items on display can be obtained from the MA (Vic) office.

TEMPERATURE

No exhibits should be placed close to or over radiators, heaters or heating ducts. Ensure that exhibits are not placed near hot lights or electrical equipment.

The recommended temperature level for museums, galleries and libraries is a steady 21 degrees (+ or – 1 degree).

DISPLAY BASICS – A final check

Simplify your exhibition area – Be selective with objects on display. It is not necessary (and not advisable) to have every item in your collection on display.

Tell the story – Does the display emphasise the most important aspects of the story or object? Does it grab you? An effective display technique is to follow a planned scheme which systematically outlines the exhibitions story line.

Explain the Object – Is the display easy to understand?
Always try to show an artefact so that its function is apparent.

Information – Is the text easy to read?

Design and Aesthetics – Does the spatial relationship between the items help the display?
It should be obvious at a glance which parts of the display are related and which are not and how labels relate to objects. Begin designing the layout of the exhibition well before it is scheduled to take place.
With this in mind think about how you can 'set the scene' or introduce the exhibition. A different coloured wall featuring the title of the exhibition and any sponsor logos, provides an introduction for the viewer and can be used to orient them into the exhibition space.

Exhibition Development

Exhibit Panel Design Basics

You have finished writing your exhibit text and have a great story to tell. One of the important next steps is designing exhibit panels that will capture your visitors' attention and make them want to read and engage with your exhibition's story.

This tool will help you create eye-catching exhibit panels which will add to the professional presentation and impact of your exhibits. **Inside, you will learn about basic design principles, suggested fonts and layout ideas, as well as a list of recommended resources for further exploration.**

The author has also made available on the BCMA Brain sample exhibit panel templates in Microsoft Word that are ready to use!

Author
Anine Vonkeman

Last Updated
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Find more resources at
museumsassn.bc.ca/brain

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Unless otherwise noted, images are supplied by the author.

Overview

Before you begin, remember that designing eye-catching exhibit panels can take years of practice. This tool is meant to provide some key guidelines and tips for consideration. Don't worry about getting everything right the first time. Practice makes perfect. Be kind to yourself as you experiment. And don't forget to proofread!

As always, the BC Museums Association looks forward to your feedback on this tool. If you have suggestions, ideas, examples or case studies of additional best practices to contribute, please get in touch:

BCMAbrain@museumsassn.bc.ca

Resources needed to use this Tool

Before you start, please consider the following resources you may need to use this tool:

Time

- Depending on the number of panels you want to produce and the content to be included, **you will need to set aside a minimum of 20 hours for the design, review, and revision of the work.** This is in addition to the time you have already taken to prepare the written content and to source images or other visuals to be included within the exhibit.

- **You will also need to plan for the time it will take to print and prepare the panels for installation.** Depending on the size of the panels, you can expect a turn-around of 4-10 days at a printing company, rush work will cost more. You can save in-house preparation time if they print the panels directly on a substrate. [A **substrate** is a backing material such as foam board, Coroplast, Sintra®, Mylar®, fabric or any other creative material you might consider.]

- **Create a reverse timeline for your exhibit.** Be sure that you include time for review of multiple drafts and proofreading.

Action

If you haven't already done so, take 30 minutes to first read The Art of Storytelling Tool and The Art of Writing for Exhibitions so that you have a clear understanding of best practices for developing written content for your exhibition.

Sample reverse timeline

Note: The sample below does not include the additional time it takes to plan and prepare for the exhibit.

April 15	Exhibit opens to the public
April 2-14	Exhibit installation
March 1-31	Panel and label preparation [if in-house]
March 1	Panels and labels printed/to printer
February 28	Final draft review/on site test
February 21	Second draft review/on site test
February 15	First draft review/on site test
February 1	Panel and label design begins
January 31	All exhibit panel design materials have been gathered
January 5	Exhibit design decisions

Tip

Don't forget to include time for gathering logos of sponsors and permissions for image usage!

Staff

- **You will need someone to design, prepare, mount and install the panels and labels.** Perhaps this is all you! Or perhaps you have volunteers, local high school students, summer students or other members of the community who may have some design experience and be interested and able to assist.

- **Connect with your local print company.** It is worth developing a relationship with your local print company. Print companies can provide design expertise, print at a variety of sizes, print directly onto a substrate, or dry mount your panels. They can also give you guidance on how to set up and provide files to them. Often local print companies are more than happy to provide design advice and assistance, if they are asked.

Materials

- **You will need, at a minimum, access to a computer and Microsoft Word.** If you are familiar with using Publisher, PageMaker or the professional Adobe Creative Suite products such as Illustrator or InDesign that is great. There are also free online design programs; a popular one is canva.com if you have time to check it out. You will be asked to create an account, but otherwise it is a free resource.

- **Printer.** Ideally one that can print large-scale, print to the edges, and doesn't jam frequently. Be sure to have a supply of ink cartridges on hand.

- **High(er)-quality paper to print on**. The paper does not have to be expensive, but using better quality materials can really help your exhibit graphics stand out.

- **Panel backing materials.** Consider how you will present the information. Will it be: large, small, framed, mounted on a substrate [backing material such as foam board, Coroplast, Sintra®, Mylar®, fabric], back-lit, installed as vinyl lettering? Consider all the various supplies will you need for any of these options.

- **Other supplies to consider**:
  - Dry-mounting and cutting equipment, including spray adhesive;
  - Heat press and dry mounting tissue; and/or
  - Good quality knives and cutting surfaces.

Sintra®

Coroplast

Tip

If the printing company can print your work directly on a backing material [or substrate], your cost will be higher, but it can also save you time and other in-house resource costs.

And remember: if using spray adhesive, wear a mask and use in a well-ventilated area!

Budget Considerations

Even if you create the panels yourself, you will need to budget for their design.

- **No budget to spare?** Use the free templates (developed by the author in Microsft Word) found on BCMA's Brain. Plug in your text, print, mount and go!

- **Small budget?** Consider contacting or visiting a printing company near you. In larger centres, printing companies may have designers on staff who can do the work, especially if you will be printing at their establishment. If nothing else, they can likely offer advice. Don't be afraid to ask.

- **A little bit bigger budget?** Consider investing in learning graphic design basics for yourself, or hiring a designer to set up your exhibit panel templates for you in your chosen design program. This initial set-up fee may be worthwhile as it can help you create a standard look and feel for your exhibit panels (and perhaps even your entire museum) that can be repurposed for future exhibits.

- **Materials.** Have a solid plan in place of how you would like the final panels to look. This will keep design costs down.

Tip

Explore free online designs options such as canva.com. Additional online programs are listed in the Further Reading and Resources section.

Using design software may help you produce a more polished look. Hiring a graphic designer to prepare exhibit panel templates for you, may be worth the investment.

Tip

Sample budgets can be found in the Further Reading and Resources section.

Keep in mind you may only be able to use two of these three options:

Time | Quality | Budget - what will you choose?

"THROWN TOGETHER" IN-HOUSE

Quick + Low Quality = $

LONGER PLANNING PROCESS IN-HOUSE

Slower + High Quality = $$

OUTSOURCED

Quick + High Quality = $$$

Cost-saving opportunities

- Find an exhibit partner or sponsor such as individuals / businesses, foundations, municipalities, tourism organizations.

- Use a free online design program.

- Invest in learning graphic design basics to save time and money in the future.

- It can be useful and cost-effective to hire a professional graphic designer to layout some templates for you to use and to determine a particular "look and feel" for your museum that can be adapted for future use.

- Exhibit development is often supported through project-based grant opportunities. The BC Museums Association has a list of outside funding sources on their website.

Remember to acknowledge your funders, partners and sponsors.

Acknowledge your supporters, including sponsors and volunteers, on a separate panel placed either at the start of the exhibit, or at the exit.

A sponsor can also be acknowledged on a panel specific to the sponsorship. Use high-resolution graphics supplied by your sponsors and ask for their logo use guidelines to be sure logos are properly used. (EPS or .png files usually work best; .jpeg is acceptable) You may have to get approval for logo use, so work this into your timeline as well.
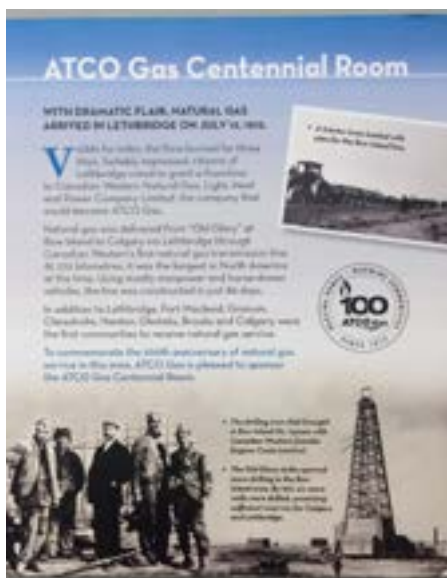
Collaboration and consultation

- Do you have **volunteers** with design experience or **access to marketing or art students** who would like the experience of designing your exhibit panels?

- Perhaps **museum studies students** at a nearby educational institution could help you research, write the text, find the images, and even install the panels? If you plan ahead they can get course credit for the work they do for you.

- **Proofreading can be a great task for a dedicated teacher/writer/editor/volunteer.** Ensure your timelines account for outside editing time.

- A partnership with a printing company, or **sponsorship** for printing costs from a community partner may also help your budget.

- **Local businesses or firms** such as engineering firms or architectural companies may also end up being good partners and help with large format printing as well as design.

- **Municipal / county / regional planning departments** may have the capability to print large-scale and can possibly assist with your large-scale print needs at little to no cost.

Other considerations

- When the exhibit is finally open – celebrate!

- Invite your local politicians to see your great work! Visit the advocacy section of BCMA's Brain to find sample template letters you can use to invite your local politicians to your museum. Create a photo opportunity with them and and publish it in your next newsletter or local newspaper.

- Consider nominating your exhibit for a BCMA Award for Outstanding Achievement.

Tip

Ask other museums or galleries to suggest graphic designers they have worked with. The BCMA listserv is an excellent resource for getting advice and recommendations from other BCMA members. Just email: bcma@lists.vifa.ca.

Let's put this Tool in action!

Step 1. Familiarize yourself with basic design principles.

The overall principle is to create a balanced design – where all elements (colour, text, images) work together to convey your message. There are no hard and fast rules about size percentages of each, but you will want to keep in mind:

- How the elements are **aligned**
- The **hierarchy** of information is clear
- There is a **consistency** in how information is presented on the various panels
- There is enough **space** between elements
- There is a **balance** of shapes [blocks of texts, images, titles]
- There is **contrast** [in colour, sizes, texture].

There are many resources online if you need more specific graphic design information – a few to get you started are included in the Appendices.

Don't worry about getting everything right the first time. Practice makes perfect. Be kind to yourself as you experiment.

Step 2. Gather all the elements you will need before you start.

Such elements will include:

- finalized, edited text
- high quality images [with permission to use where necessary]
- graphs or other graphics that support your exhibit's story
- sponsor logos

Having to find room for additional elements after you've started your design is counter-productive.

Step 3. Decide on the printer you will use.

Will you be printing in-house or at a printing company? This will dictate the size of your panels and labels and perhaps whether or not you print in colour or black-and-white.

Below are some other important considerations – and questions to ask a printing company – before you get started:

- Can they print directly on a substrate? Or will they print on paper that will have to be mounted on foam core or other substrate?
- What is the maximum size they can print?
- Can they print all the way to the edges [i.e. bleed]?
- Are they able to print in full colour?
- Confirm the format in which they would like the files to be submitted.
- If you would like to be as environmentally-conscious in the materials you present, consider:
  - Are the inks used in printing vegetable or other non-oil based?
  - Does the substrate you are printing on off-gas?
  - Consider eco-friendly substrates: Are they made of recycla-ble/recycled materials? Can you reuse or repurpose them?

Step 4. Make sure you have the correct panel measurements worked out before you start.

Having to adjust your design because the panel size has changed is time-consuming.

Step 5. Present a cohesive look for your particular exhibit.

Use a consistent layout and formatting in all of your panels and labels, including colours, headers, line spacing, how quotes are presented, where text elements such as captions and credits are placed, how your images are presented, what size and shape your panels will be.

- Use Sample Templates (in Microsoft Word) that are available on BCMA's Brain. Or, use other programs you are already comfortable working in.

Step 6. Consider these important text tips.

- No matter what the size of your panels, white space is your friend – not every area needs to be filled. Too much information, including visual information, overwhelms a reader.
- Include a brief introductory paragraph; helpful for those who many not want to read the whole panel.
- Use minimum line spacing of 1.15 pt.

- Use body text that is left justified. Alignment of headers and quotes can vary but try to use consistent alignment in your panels.

- Turn off hyphenation.

- Use a maximum of two fonts, a serif and a sans-serif, one for the introductory paragraph and main body text, the other for titles, headers. Serifs are the little flourishes added to letters of serif fonts; sans-serif fonts do not use these.

- Experiment with fonts to find what is more readable at different sizes.

- Popular fonts used in galleries and museums [all shown here at 14 pt]:
  - **Serif**: Cambria, Garamond, Times New Roman, Palatino
  - **Sans-serif:** Arial, Candara, Gill Sans, Helvetica neue, Optima

- Avoid using font sizes that are too small – it makes for unpleasant reading experiences and will likely mean that the information gets skipped.

- Use **bold**, *italics,* and underline formatting options sparingly, for emphasis only. The last two in particular make reading text more cumbersome for visitors.

- Use ALL CAPS for titles or headers only; IT IS HARDER TO READ CAPITALIZED TEXT.

I shot the serif.

Exhibit Development
Exhibit Panel Design Tips

- Use contrast in presenting your text. Avoid light-coloured text on a light colour background, dark on dark, blue on green, red on orange... if you have trouble reading it, your visitors will too.

While the use of this particular green background mimics the colour of green screens in filmmaking, the colour creates difficulty for visitors with issues such as colour blindness. In addition, the black text is not bold enough to create enough contrast with the background.

RECOMMENDED FONT SIZES

PANEL SIZE	8.5" x 11"	11" x 17"	24" x 36"	32" x 48"
Title	40pt	50pt	80pt	100pt
Subtitle	24pt	38pt	48pt	75pt
Intro/Header	14pt	16pt	28pt	32pt
Body Text	12pt	14pt	24pt	28pt
Quote 18 pt	18pt	24pt	36pt	48pt
Caption	9pt	10pt	18pt	18pt
Image Credit	8pt	9pt	16pt	18pt

Exhibit Development
Exhibit Panel Design Tips

Step 7. Plan for effective use of your images.

What story do your pictures tell? Be sure they connect with the panel text.

If you are comfortable working with images in the design program or template, then you will want to consider the following guidelines:

- Placement – sketch out your panel layout first. Inexpensive graph paper works great for this.

- Use no more than 3-4 images [including graphs] on any one panel.

- Use high-quality images.

- Make sure you have usage permission for each image.

- Be sure to provide credit. Make space for credits on or near the image.

- Should your images be cropped? Cropping images allows you to remove extraneous information, improve composition, and/or highlight the subject.

- Resize images without distorting them: always use a corner handle, not one on the outer sides, and hold down the Shift key when dragging the handle.

- Borders or no borders? It's up to you. Never add borders to logos, or place logos in a box.

- Consider printing a few very large images on an entire wall for extra impact. You can include a small text panel nearby (as pictured below), or a little bit of text printed at the top of the photo.

Step 8. Be creative with your use of colour. Be subtle with your use of lines.

Use colour as a unifying element throughout the exhibit.

Image source: Fernie Museum

Use colour on your panels to tie into colours used elsewhere in the exhibit

Use colour to emphasize different story panels.

Use coloured backgrounds on a single panel to set storylines apart or to create emphasis.

Avoid using outlines on boxes, they can be jarring visual elements. Use sparingly to create separation.

Step 9. Consider all abilities.

The *Accessible Canada Act: An Act to Ensure a Barrier-free Canada* came into force on July 11, 2019. It will benefit all Canadians, especially Canadians with disabilities, by helping create a barrier-free Canada. The new Canadian Accessibility Standards Development Organization [CASDO] will review accessibility standards, promote research, and share information related to accessibility.

Take some time to research how design can play a role in creating **accessible exhibits**. Visitor age, physical limitations, medical conditions should be considered in how you present the information.

- **Is your audience older?** Visitors may have more trouble reading white text on a coloured background – unless the text is large enough – or text on top of a texture or image, and may not be able to read small print. The higher the contrast, the greater the legibility; use a minimum 70% contrast. Use a matte surface to avoid glare, which can make reading/viewing of elements diffi-cult. People with low vision should be able to move close to a panel; greater viewing distances require larger type size.

- **Do they have vision loss or reading impairments?** Perhaps you can create an audio guide, or have volunteer docents specifically trained in being the eyes of the visitor, or creating tactile signage where appropriate.

- **Are they colour blind?** Avoid red/pink or green, and coloured text on a black or dark background.

- **Are they hearing impaired?** Providing transcripts of or subti-tles on audio/visual presentations could be offered and/or have American Sign Language literate volunteers available.

- **Do they use a wheelchair?** Optimal height placement on the wall for all viewers is between 2.5-6.5 feet [0.75 – 2 metres] from floor level [Accessibility-wheelchair.jpg – image source un-known].

Visitors with dyslexia

People with dyslexia will benefit from your use of certain fonts, such as Helvetica, `Courier`, Arial, and Verdana. A font called **Dyslexie** was designed by graphic designer David Boer who suffers from dyslexia; every letter is uniquely shaped and helps eliminate common reading errors of dyslexia. **OpenDyslexic** is a similar font.

If you prefer not to use such fonts on the panels themselves, you could provide a binder or a clipboard with the same text printed in one of the suggested fonts. Use dark text on a light background that is not white.
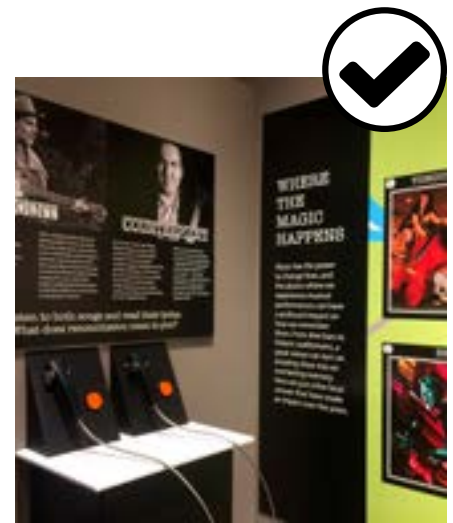
Both images are examples where the design is accessible: the top image shows white on black text that is large enough and/or approachable. The bottom image shows that a visitor has access to a text panel to examine elements up close.

Step 10. Last, but certainly not least.....Proofread!

To avoid the embarrassment of having a visitor point out an error on opening day, proofread before printing. Then have someone else proofread before printing. Be sure to build proofreading into your exhibit timeline.

Print a sample panel and test it in situ – get opinions from others:

- Would they take the time to read it if they were visiting?
- What works/ what doesn't?

Be prepared to hear things you don't want to hear and to be flexible enough to make changes!

Final Thoughts

Here are the Top 10 Tips to consider when designing your exhibit panels:

1. Familiarize yourself with this Tool and basic design principles.

2. Create a reverse timeline for your exhibit.

3. Know the size of the panels you are creating and how they will be presented (or mounted).

4. Decide on a theme or "look and feel" with your team.

5. Make sure your printer can accommodate your needs.

6. Gather all the materials you need before you start.

7. Take your time; and plan for extra time.

8. Trust your instincts.

9. Prepare for multiple drafts and build in time for proofreading.

10. Enjoy the end result, even if it's not perfect!

Further Reading and Resources

Sample Budgets

1. FERNIE MUSEUM - BENT ON ART: KOOTENAY QUEER & TRANS ART EXHIBIT

Intro lettering, artist statements, labels

- Graphic Design [Intro lettering] $45
- Intro lettering printing and installation $150
- Artist statements, labels* drymounting $200
- **Total design, fabrication, installation**   **$395**

  * Statements and labels were designed using canva.com and printed in-house.

Image source: Fernie Museum

2. FERNIE MUSEUM - BACKROADS: AN EXHIBIT BY MICHAEL HEPHER

Intro panel, 6 exhibit panels, supplementary didactics, ¾ scale Volkswagon bus

• Graphic Design	$480
• Panel fabrication & installation	$709
• Exhibit Panel printing	$826
• VW Bus	$1,600
• Dry mounting (secondary didactics)	$242
• Exhibit Supplies*	$52
Total design, fabrication, installation	**$3,909**

Plinths were already in-house and not included in budget.

Image source: Fernie Museum

Printers / printing options

- Staples Business Depot [paper stock, larger-scale printing on various substrates, 24x36" max]
- Costco [canvas 40x60" max, or metal printing 24x36" max]
- Home Depot [Coroplast, 48x96" max]
- London Drugs [canvas or metallic canvas, 40x60" max]
- Michaels [cutting, acid free spray adhesive, dry transfer supplies]
- Other drymounting supplies [such as Trimount permanent dry mounting tissue]: drytac.com

Note: This information is current as of June 2019.

Sustainable materials or "substrates"

- **Sustainable Development Guide**, Chapters 4, 5 and 7:
  museums.ca/client/document/documents.html?categoryId=361
- **Guidelines for Material Selection:**
  www.greenexhibits.org/build/selection_guide.php
- **Madison Children's Museum Green Guide:**
  issuu.com/madisonchildrensmuseum8/docs/greenguide_2014_web
- **Oregon Museum of Science and Industry** Green Exhibits Guide:
  www.sustainablepractice.org/wp-content/uploads/2012/12/OMSI-Green-Exhibits-Guide.pdf
- **An example of eco-friendly materials;** ask your local printer
  if they carry or can bring in:
  www.epicdisplays.com/Eco-Systems-Green_Materials.html
- **Alternative substrate ideas:**
  exhibitcitynews.com/graphics-the-good-the-bad-and-the-ugly-1082

When To Seek Outside Help

If you are in need further advice on how to use the associated templates, you can contact the author of this Tool:

Anine Vonkeman one match fire | design & communications

If you are looking for help in sourcing printing materials, your BCMA colleagues at larger institutions can be helpful. Many are happy to share their knowledge and expertise.

You can email the BCMA listserv with your questions: bcma@lists.vifa.ca.

Bibliography of resources

Online graphic design courses

- **"11 Extremely Helpful (And Free!) Online Graphic Design Courses"**
  format.com/magazine/resources/design/free-online-graphic-design-courses
- **"The Complete Graphic Design Theory for Beginners Course"** [low-cost subscription]: udemy.com/
  graphic-design-theory-for-beginners-course/
- **10 Best Graphic Design Course & Certification Online [2018 -19]**

  digitaldefynd.com/best-graphic-design-course-program-classes-tutorial/
- **The 10 Best Online Graphic Design Software Programs"**
  format.com/magazine/resources/design/online-graphic-design-software

Graphic design / Exhibit design

- **Glasgow Museums Display Guidelines:** A Practical Guide for Exhibitions
  britishcouncil.in/sites/default/files/guidelines_for_museum_display.pdf
- **Graphic Design Tips Infographic**
  www.amberddesign.com/my-uploadz/2017/11/graphic-design-tips-101-infographic.jpg
- www.amberddesign.com/graphic-design-tips-for-beginners
- **A Rookie's Guide to Graphics**
  www.exhibitoronline.com/topics/article.asp?ID=1449

NOTE: You will be required to create a free account to access this article.

Fonts

- **Typefaces for Exhibitions**
  blogs.stockton.edu/southjerseyseminar/files/2011/09/Typefaces-for-Exhibitions.pdf
- **Explorit Science Center Guidelines for Interior Signs and Labels**
  www.explorit.org/board/about/board/explorit-board-documents/Exploritsigns-labelguidelines.pdf
- **A type family originally developed for New York's Whitney
  Museum, Whitney contends with two different sets of demands:
  those of editorial typography, and those of public signage:**
  www.typography.com/fonts/whitney/overview/
- Freefonts.com
- DaFonts.com
- 101Fonts.com

Accessibility

- **British Dyslexia Association,** Dyslexia Style Guide
  bdadyslexia.org.uk/common/ckeditor/filemanager/userfiles/About_Us/policies/
  Dyslexia_Style_Guide.pdf

- **Good Fonts for Dyslexia**
  dyslexiahelp.umich.edu/sites/default/files/good_fonts_for_dyslexia_study.pdf

- dyslexiefont.com

- opendyslexic.org

- **Smithsonian Guidelines for Accessible Exhibition Design**
  www.si.edu/Accessibility/SGAED#page_21

- **The Association of Registered Graphic Designers of Ontario**,
  A Practical Handbook on Accessible Graphic Design, 2010
  www.rgd.ca/database/files/library/RGD_AccessAbility_Handbook.pdf

- **MuseumPlanner.org**
  museumplanner.org/category/museum-exhibitions/exhibition-design/ada

- **Braille Literacy Canada**, Accessible Signage Guidelines, 2016
  www.brailleliteracycanada.ca/CMFiles/Accessible_Signage_Guidelines_BLC-Print-
  Formatted.pdf

- **Making an accessible Canada for people with disabilities**
  www.canada.ca/en/employment-social-development/programs/accessible-peo-
  ple-disabilities.html

- **Science Museum of Boston,** Consideration for Designers
  legacy.mos.org/exhibitdevelopment/access/design.html#Signage

- **2010 Americans with Disabilities Act Standards for Accessible Design**
  www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards_prt.pdf

- **UNHCR Convention** on the Rights of Persons With Disabilities:
  Accessibility
  www.ohchr.org/EN/HRBodies/CRPD/Pages/ConventionRightsPersonsWithDisabili-
  ties.aspx

More inspiration

1. Check out the BCMA Brain Exhibition Development section for innovative case studies in exhibition design submitted by BCMA members: http://museumsassn. bc.ca/brain/tools-and-resources/exhibit-development/

2. Enjoy these images provided by the author of this Tool, Anine Vonkeman.

Vinyl Lettering

Home Free is also an example of a low--cost presentation: Descriptions of what artifacts mean to community members who selected them are printed in-house and presented in a scrapbook.

Text incorporated in background panels

Substrates

These introductory panels are printed on Mylar ® and placed in frames with LED strips. The larger panels are printed on Sintra ® and lit with spotlights.

Other ideas

Consider different shapes and positioning for your panels.

Using minimal text, together with eye--catching shapes and graphics, can have a great impact.

Photo Credit: Amanda MacKay (Member, Alberta Museums Association)
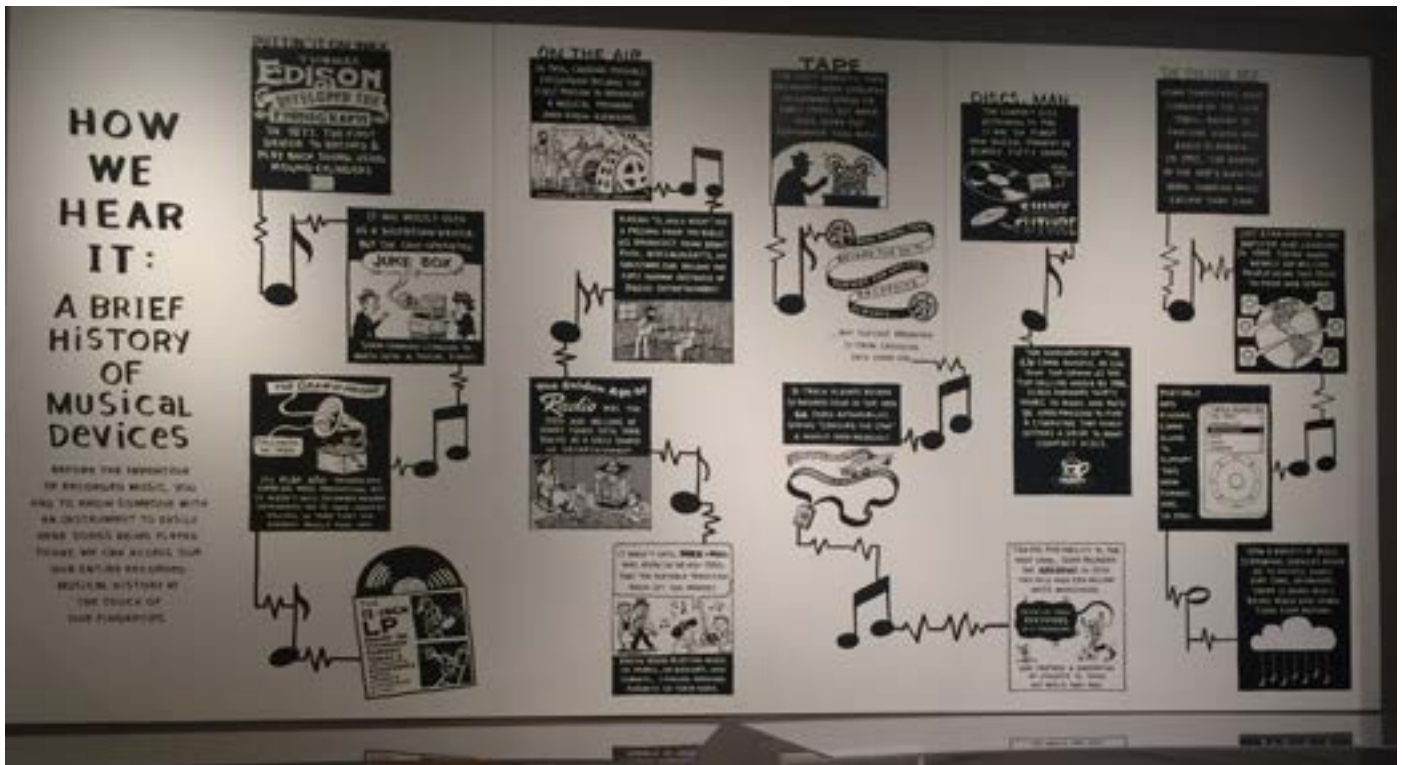
Don't forget to tap into the talent in your community. In this case, a local cartoonist was commissioned to create the exhibit panels.

Here you can see the cord running power to the LED strips in backlit frame. Another fun exhibit feature: popcorn made from expanding foam!

Display techniques and supports

This Help Sheet relates to standard C 2.3

An important, and often neglected, part of designing and developing a display is making certain that appropriate supports, display materials and techniques are used when displaying collection items. Displaying items incorrectly and without proper support over an extended period of time can cause irreparable damage. Careful and appropriate display of items also shows visitors and donors that the museum cares for its collection.

This Help Sheet introduces some principles for safe and effective display of items. It also provides basic guidelines for identifying items that require support, and for making and using appropriate supports.

Some principles of good display

1. Items should be displayed in ways that reduce the impact of the external environment. For example:
    o Be aware of where a fragile item is positioned and the amount and intensity of light regularly falling on it. Sensitive items are better displayed behind Perspex or glass or in an enclosed case rather than in the open air. This limits their exposure to pollutants in the external environment and protects them from changes in temperature and humidity.
    o Large items in direct contact with the floor or a wall are more at risk of damage from dampness, dust, changes in temperature and pest infestation. They are also more likely to be bumped by a visitor or an enthusiastic worker with a vacuum cleaner. It is better to display the object lifted slightly above the floor, and away from the wall, on plinths or other stable and strong supports.

2. Items should be displayed so that their integrity is maintained. For example:
    o The spine, cover and pages of a book displayed open at a particular page without support will gradually become distorted. The spine might crack and the cover may warp. The book will forever fall open to the same place and the open pages will fade and yellow from prolonged exposure to the light. Using an appropriate book support and turning pages regularly will reduce damage.
    o If a dress is hung on a wire hanger or stretched over an unsuitable store mannequin great strain will be placed upon the seams and other fragile parts of the costume. The sharp line of the wire hanger will gradually cut into the fabric. Any creases created by the way the skirt hangs will become ingrained, the fabric weakened and prone to tearing. The parts of the dress exposed to light will fade. Displaying the dress on a padded hanger or on a specially constructed mannequin will contribute to its preservation.

3. Copies are an acceptable alternative
   o The quality of digital scanning and printing allows for accurate copies of original documents and photographs to be made. In many cases it is better to store irreplaceable originals under archival conditions and only use copies for display.

4. Less is more
   o Avoid crowding objects into display cases, particularly if it results in items touching or overlapping each other without a barrier in between. Choose the best examples or the items with the best connected stories.
   o Avoid displaying very fragile and/or sensitive items and identify risks to any items on long-term display. Rotate items so that each spends less time out on open display. Not only does this add interest for returning visitors but it also aids in the preservation of the collection.

How to recognise if an object needs support

Virtually all items on display require some form of support or protection. Consider each object before placing it on display; examine its condition, the material it is made from and the way it is made. A few simple things to keep in mind are:
   o The more fragile an object, the more support it is likely to need.
   o Items that have heavy parts such as covers of books or hinged lids on boxes are likely to become damaged without appropriate support.
   o Some materials are more sensitive to the external environment. For example textiles, paper and pigments such as watercolours are particularly susceptible to damage from light and UV radiation. Metal items corrode more readily when in contact with uncoated wood.

Safe materials for making your own display supports

Always look for archival quality materials. These include:

   o Acid-free cardboard and paper. These can be used for placing under flat items to prevent contact with wooden surfaces such as shelves or the inside of display cases. Wood can produce active chemicals which can damage items. Card or Corflute (a hollow fluted polyethylene plastic board commonly used for signs) can also be folded to create V-shaped supports for books. See the instructions included as an appendix to this Help Sheet.
   o Acid free tissue paper: This can be crumpled and used to pad and fill-out the inside of a hat, a pair of boots, or parts of a costume on display.
   o Mylar (polypropylene plastic film): This comes in the form of sheets or pockets. Pockets can be used for all sorts of paper items. Two mylar sheets can be sealed on all four sides (with double sided-acid free tape) to encapsulate items. The tape must only come into contact with the Mylar, not the item. Mylar strips can also be used to hold pages of a book open (do not force) or as photo corners (attached to the support not the photograph).
   o Tyvek: This is a high-density polyethylene woven material which is often used to protect items such as textiles from dust and water while allowing air to circulate. Tyvek has many other uses in displaying items. It can be placed as a protective layer between objects and shelves or display cases. It can be filled with Dacron (polyester wadding) and sewn into pillow or cushion-type supports which can be

used to support book covers or to pad garments. It can be used to cover all sorts of everyday objects such as cardboard rolls or pieces of non-archival foam so they can be used as supports.

- o Cotton or calico cloth and Dacron wadding: The cloth can be sewed into pillows and filled with Dacron wadding to make pillow supports for objects and books, display cushions for small items, or padded hangers for garments. See *reCollections 'Caring for Cultural material* Volume 2q (p. 9-10) for instructions for making a padded hangeror your own mannequin (p. 19-20)[1]

- o Archival foam: This must be covered with Tyvek or cotton so that it doesnq come into direct contact with an item. It can be cut to all different shapes and used to support objects. For example, a glass bowl might be placed in a shaped foam ring to prevent it moving, thereby reducing the risk of breakage.

Other useful aids for making your own display supports

- o Cutting board and a steel ruler for cutting archival board and/or a small guillotine for cutting paper
- o Sewing kit, cotton tape, tape measure
- o Double-sided sticky tape, photo corners
- o Cardboard rolls (various sizes) . these need to be covered with cotton or Tyvek
- o Various sized wooden display plinths and boxes (sealed)
- o Perspex display stands of different sizes
- o Polystyrene heads (for hats)

A checklist of things to avoid

A simple rule of thumb is to avoid attaching anything to, or passing anything through, an item. Items can be supported or laid on top of archival supports but should not be attached to them in any way. Steer clear of the following:

- o Pins, thumbtacks or staples
- o Blue-tac
- o Sticky tape, (including non archival standard double-sided tape)
- o Glue, adhesives of any kind
- o Velcro dots and strips
- o Sharp wire
- o Wire hangers
- o Rubber bands
- o Do not laminate original photos or documents. Laminating destroys the historical integrity of an object and it cannot be reversed.

Also watch out for
- o Unprotected wooden shelves or display cases. Use acrylic paints or polyurethane for cases and allow these sealants to cure for 2-4 wks before use. Avoid chipboard, masonite and particle board.
- o Use of wool felt inside display cases. It emits sulphur gases and attracts insects. Use a sheet of Tyvek instead.
- o Display cases that you canq open easily and safely
- o Unsupported, sagging objects such as books, documents, textiles

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[1] Heritage Collections Council, *reCollections: caring for collections across Australia*, 1998.

- Unsupported fragile items such as objects made from glass. They can ±walkqtheir way off shelves due to vibration caused by people walking past.
- Sharp creases and folds in textiles and garments
- Overlapping items without placing a barrier between them such as tissue paper or Tyvek
- Items displayed on the floor or against the walls. Use some kind of support to lift them from the ground.
- Items exposed to constant bright light. See the *Museum Environment* Help Sheet for pointers on how to avoid this.

A note on large outdoor objects
- For cars and tractors, display up on blocks or jacks to keep the tyres off of dirt or gravel.
- Provide shelter for significant large objects on outdoor display. Keep them off the ground.

Good display support
Book is resting on a fabric covered board with cover supported by a fabric covered pillow.


Encapsulating a document in mylar.

Poor display support
Drawing pins pushed through gloves in order to hang them from the wall.

Construction of a book support for display

Kristin Phillips: Artlab Australia

Books that are displayed open need appropriate support in order to prevent damage to the book spine, splitting of the text block and possible loss of pages. Such damage is difficult and expensive to repair and should always be prevented. A book support specifically constructed to fit a book will allow it to be safely displayed.
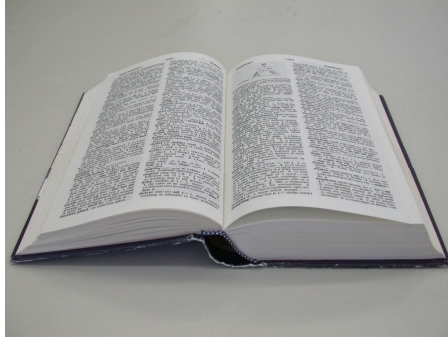
Note the sharp bend in the spine. Damage may occur if the book is not properly supported.

Selecting a book for display.

Determine if the book is in good condition. Check to see if:

- the covers are well attached
- the spine is damaged
- pages are coming loose or are torn

Fragile or damaged books may not be able to be displayed without causing further damage. It is important not to force a book open or bend the covers or pages to any angle where you feel any resistance from the spine.

Construction of plastic loop to hold pages open

If the book will not stay open on the pages to be displayed a loop of clear polyethylene plastic can be used to hold the pages. Cut a 1 cm wide strip of plastic. Loop the plastic strip around the book on the selected page so that it is firm but not tight. Cut the length of the loop allowing for a 2cm overlap and attach the overlap with double sided tape. Double-sided tape doesn't have to be archival quality because it is not in direct contact with the book.

Construction of book support
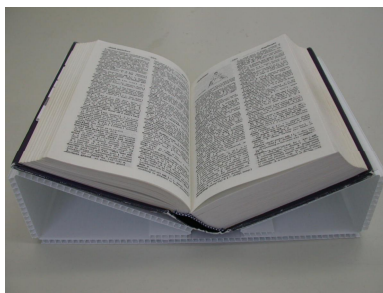
Note that the spine is not sharply bent.

Corfluteï is recommended for constructing book supports. Corfluteï is hollow fluted polyethylene plastic board commonly used for signs, which can be purchased from an art supplier. Supports for smaller or lighter books may also be made with acid-free cardboard.

Once the selected pages are secured measure the book for the support. Place the book on the table and whilst supporting the covers determine a safe angle that will be suitable for display. Use props to temporarily hold the book at the desired angle. Measure the profile of the book.
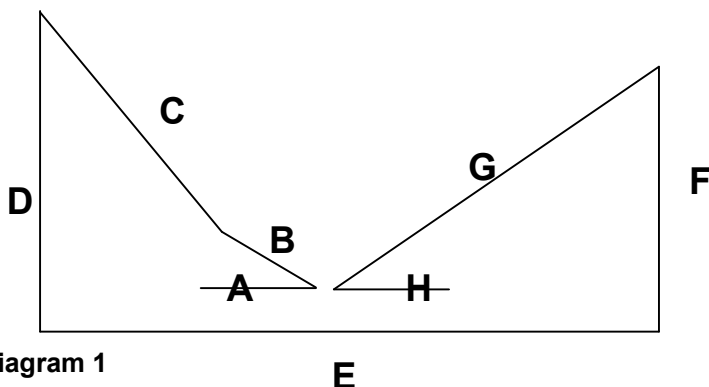
Diagram 1

- Measure the following as per diagram 1
  - **A.** Flap (generally 20 mm, if slope is very low may not be required)
  - **B.** Spine (this may be in a straight line with **C** or adjacent to the back cover depending on support)
  - **C.** Front cover (the length should be 15mm less than the actual cover)
  - **D.** Left hand height of support (this may be a different height to **F**)
  - **E.** Base (the base will be slightly shorter than the outside edges of the book)
  - **F.** Right hand height of support (this may be a different height to **D**)
  - **G.** Back cover (The length should be 15mm less than the actual cover)
  - **H.** Flap (generally 20 mm, if slope is very low may not be required)

Measure the height of the book (Less 1cm so that the support does not protrude).

Mark out a rectangle onto the Corfluteï which is the total of measurements A-H (length) and the height. Corfluteï must be measured and cut so that the flutes/inner walls run from the top to the bottom of the book. Cut the rectangle as marked.

A	B	C	D	E	F	G	H
				Height of the book – 1cm ↕ Direction of the flutes ↑			
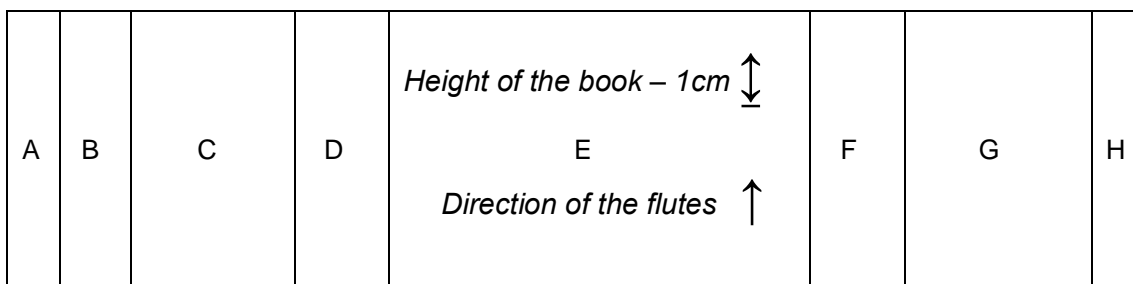
The length is the total of each measurement A-H

Mark the lengths of each of the measurements A-H onto the board (Diagram 2). Do not cut the line between the spine and the cover if they sit in a straight line. Cut all of the other lines as marked being careful to only cut through the top layer of the Corfluteï . Fold the board at each cut so that the cut layer opens outwards.

õ õ õ õ . Note only the top layer of plastic is cut to allow the board to fold

Fold the board into the book support shape and adhere using hot glue.

Covering sides for display

For display the open sides of the support can be covered. This is only done to improve the appearance of the support for display. Trace the shape of the sides onto cardboard chosen to best suit the display. Cut the shape and adhere it to the sides of the support with hot glue. It is not essential that cardboard used for this purpose is acid free as it is not directly in contact with the book.

THE EFFECTS OF STORAGE AND DISPLAY MATERIALS ON MUSEUM OBJECTS

Many materials that may seem suitable for storage or display purposes can cause serious damage to museum collections. They can cause corrosion, discolouration or deterioration of objects, either because they give off harmful vapours or because they are in direct contact with the museum object. These processes of corrosion, discolouration and deterioration are sped up by high temperature and/or high humidity levels.

Harmful volatile substances include formaldehyde, acetic acid, formic acid, sulphuric acid, carbon dioxide, sulphur dioxide, nitrogen dioxide, ozone, chlorohydroxide and ammonia gas.

Sources of these substances may be wood products, acrylic resins, paints, lacquers and varnishes, glues and adhesives, pesticides, insecticides, fungicides, furnishing fabrics, adhesive tape and other sticky materials such as "Blu-tack". Electrical machinery such as electrostatic air cleaners and some photocopying machines may produce ozone. Burning fossil fuels can produce harmful vapours and air-borne particles.

WHAT DOES THIS MEAN FOR THE OBJECTS IN A MUSEUM COLLECTION?

All **metals** are affected by harmful vapours released by wood, although some more than others. Lead objects stored in oak cabinets have shown considerable corrosion. Silver and copper objects, metal embroidery threads, sequins and silver photographic images will tarnish as a result of sulphur gases, released by wool.

Paper objects, books, maps, prints, drawings, watercolours, letters and charts will suffer from discolouration and deterioration when mounted on cheap, acidic mountboard. Adhesive tape (sticky tape, masking tape, etc.) will contract and eventually separate from the paper it is used on, leaving a sticky yellow stain that is usually difficult or impossible to remove. Some watercolour pigments are sensitive to acidic and other vapours.

Photographic material, slides, prints and negatives are affected by the vapours and plasticisers used in polyvinyl chloride (PVC) and some other plastics. Sulphur gases tarnish the metal plates on daguerreotypes and paper prints are affected by oxides, which results in a bluish metallic sheen called "silver mirroring".

Textiles will deteriorate more rapidly when they are in contact with acid-releasing materials, such as cheap mount board and acidic cardboard rolls. New fabrics for displays may have been treated with dyes, fire retardant treatments and waterproofing or other finishes. The materials used for these treatments may cause fading and other damage to historic textiles. Pins and tacks used for mounting and framing will rust when in contact with **textiles** or other materials with a natural moisture content. The rust may cause deterioration of the pinned or tacked object.

Bone, **ivory** and many other materials are adversely affected by the vapours from rubber and urethane foam ("foam rubber", vinyl tiles, flooring adhesives and rubber-backed carpets). Volatile sulphur compounds from rubber will cause a yellow or orange discolouration in ivory and cellulose acetate ("celluloid") artefacts. The plasticiser in PVC is also an excellent plasticiser for celluloid objects.

Magnetic tapes (cassettes, reel-to-reel and computer) are affected by magnetic sources, such as catches on doors.

Objects made of **rubber** and **modern plastics** can be very unstable and are easily affected by plasticisers released by some wrapping materials (such as PVC bags, sleeves and sheeting). Ozone, which is naturally present in the air and can also be generated by electrical machinery, speeds up the deterioration of rubber. Metals can also have an effect on rubber when in direct contact with it.

Pigments in **feathers** and **ethnographic objects** will fade when affected by sulphuric acid (air pollution, wool felt and fabric).

Formaldehyde, present in many types of wood and composite board, reacts with many different materials to form formic acid, which can be harmful to a variety of museum objects.

HOW TO CHOOSE SAFE MATERIALS

1. Materials used to protect, shape or support the object.

In storage these materials are the first layer of protection against dirt, dust and other harmful influences. They are often in direct contact with the object, and should therefore always be as chemically stable as possible, as any harmful substance in them will directly effect the object.

Acid-free tissue paper is made out of cotton or linen rags, or highly purified wood fibre materials. It should be lignin free, because lignin will cause the paper to become very acidic. Lignin free paper is usually sold as "acid-free", "museum quality" or "arc hival quality". It is always important to check whether the material is "buffered". Some acid-free tissues contain buffering alkaline compounds. These buffers can help prevent migration of harmful acidic products onto paper objects. Buffered acid-free tissues are safe for use with most collection items. However, they should never be used for photographic material and textiles. For these materials only unbuffered acid-free tissue should be used. Acid-free tissue is used as interleaving tissue when rolling or storing flat items, and as a wrapping or "padding" material for three-dimensional objects.

"Melinex" sleeves, made of transparent polyester sheeting, come in various sizes and are very useful for the storage of photographic material (prints, negatives, slides, plates) and work on paper (prints, drawings, letters, documents, posters and pamphlets). They should not be used for pastels, charcoal drawings and other works with delicate images as the particles of these can migrate onto the sleeve due to static forces. "Melinex" can also be purchased as a continuous film, which can be heat-sealed into custom-sized sleeves. (At least one side of the sleeve should be left unsealed.)

Polyethylene sheeting is free from coatings or plasticisers and is inert. It is useful as a covering material over shelves, pallets and boxes to prevent dust or water damage. It doesn't allow the passage of air though, so can create a harmful microclimate beneath it.

Polyvinyl chloride (PVC) or other plastics that contain chloride or nitrate should not be used, as they give off harmful vapours.

"Tyvek" sheeting is made of high-density polyethylene fibres and prevents the passage of water in one direction (from the smooth outside to the rough inside), but allows the passage of air in both directions. It can be used to make dust covers for costume, (upholstered) furniture and rolled textiles.

"Evolution" sheeting is made of spun bonded polypropylene that can be used for wrapping large objects.

"Bubblewrap" is polyethylene sheeting with bubble padding on one side. It is used as a protective wrapping when transporting museum objects. The bubbles should always face away from the object and an isolating layer of acid-free tissue should be placed between the objects and the Bubblewrap. It should not be used for the long-term storage of museum collections.

For the mounting of prints, drawings, and other (small) flat objects **acid-free mount board** is a good choice. Acid-free board is also used for the fabrication of **storage boxes**, some of which may be buffered to protect the contents from migrating acids. As with acid-free tissue, these buffered boxes should not be used for vulnerable items such as photographs and textiles, as the buffering substance itself may cause damage to the objects.

"Ethafoam" and **"Softlon"** are stable polyethylene foams. They can easily be cut into supporting mounts for three-dimensional shapes. They are available in a range of colours, but only the black and white versions are safe for use, as the colorants used in the others may stain or damage objects.

"Perspex" (polymethylmethacrylate) can be made into stands for (small) glass, ceramic and other solid objects in good condition. It can be rather difficult to process, and attention should be paid to ensure that adhesives used do not contain any harmful vapours.

2. Materials used for shelves, cupboards, cabinets and display cases.

These materials are used to create safe environments (cases, cupboards, cabinets) to protect the objects inside from the damaging effects of air pollutants, dust, fluctuations in temperature and humidity, light (in storage) and enthusiastic museum visitors. It is important that, although they are not in direct contact with the objects, these materials do not give off any harmful substances. The levels of harmful substances can rapidly build up within the closed case or cupboard, creating a damaging environment for the objects rather than protecting them.

Metal is the preferred material for display cases and storage shelving or cupboards. It is strong, smooth, inert, non-flammable and does not emit any harmful vapours. However, to prevent rusting in situations with high humidity levels, it should always be covered with a protective layer, preferably a baked enamel finish rather than a paint.

Woods produce harmful vapours such as formic and acetic acid and peroxides, although some are worse than others. Freshly cut and unseasoned wood produces the greatest quantities of these vapours. Oak, Western red cedar, Cypress and Douglas fir are some of the woods most commonly associated with damage to collection items through the emission of harmful vapours. If wood is to be used, try to use: Kauri pine, Hoop pine or a soft wood and make sure the wood is sealed with a paint-on sealant or a barrier foil (see below).

Composites, such as plywood, chipboard, particleboard, fibreboard and masonite all cause problems. Marine grade hoop pine plywood uses a higher grade of adhesive that other composites and so is more stable if a wood composite must be used. It does however still emit some formaldehyde. The release of harmful vapours by wood and wood products is a normal chemical process that cannot be prevented entirely. The only way to minimise the emission of any harmful gases is to seal the wood with either a **paint-on sealant** or a **barrier foil**.

Paint-on sealants that can be used are water-based polyurethane sealants, as well as good quality acrylic latex emulsions and epoxy-resins. Enough time must be is allowed for them to dry thoroughly (check the manufacturer's specifications on how much time needs to be allowed for this). This is particularly important for water-based sealants, which will form a skin that is dry to the touch hours before all the water has escaped. When wooden or composite pieces painted with these sealants are enclosed in a case or cupboard too soon the humidity level inside the case will rise. In general a period of 10 days should be allowed after painting for the sealant to completely dry, and for any volatile organic compounds in the sealants to off-gas.

Barrier foils consist of a metal foil, which is impermeable to gases, sandwiched between layers of inert plastic. They can be heat-sealed onto the wood with an iron and are an effective barrier as long as the foil is intact. Nailing, stapling or drilling holes destroys its effectiveness. It is important to seal the edges of boards as these emit vapours at a higher rate than the other surfaces. As an alternative, aluminium foil coated on the back with PVA (Aquadhere) can be used, but it is much more vulnerable and can very easily be damaged.

Fabrics should be chosen carefully. Wool and all fabrics coated with fire retardants or finishes and foam or adhesive-backed fabrics have been found to give off harmful vapours and are therefore not recommended.

Undyed and **unbleached cotton** or **linen** fabrics are safe to use, but they have to be thoroughly washed and rinsed before use. Dyed fabrics and synthetic blends should always be tested before use. The fastness of dyes can be checked by rubbing the fabric with a piece of white cotton, first dry and then repeated with damp cotton.

Glass is safe for use near museum objects. It is scratch resistant, gas impermeable and is available laminated or coated with UV-filters. Weight may be a disadvantage though, and its low surface temperature may cause condensation and mould growth on the glass and also on organic materials that become damp as a result of the condensation.

Attention should be paid to **cleaning agents** used for glass: they should not contain vinegar or any other harmful substances.

Polymethylmethacrylate ("Perspex/Plexiglass") and **polycarbonate ("Lexan")** sheets are also acceptable materials, particularly when they have built-in UV absorbing properties. They are lighter than glass and have a higher surface temperature. They have good impact resistance and crack rather than shatter. Disadvantages are permeability to gases, a relatively soft surface that is easily scratched and less rigidity (which may cause large pieces to bend). When used in framing, static can be generated during cleaning, causing parts of the object to stick to the inner surface.

Other materials, such as **adhesives** that may be used to join several of the above components and **labels** should always be checked for the presence of one of the harmful substances mentioned on page one. Hot melt glues (polypropylene type) and Tyvek or acid-free paper labels are good materials to use.

MUSEUM OBJECTS

It should be remembered that museum objects themselves react in similar ways to the materials described in this factsheet. Modern organic materials are most likely to release harmful gases. For instance, badly processed photographs may give off acidic or sulphidic gases that cause embrittlement and discolouration of the paper, and cellulose nitrate ("celluloid") objects release vapours that speed up their own deterioration. These processes particularly occur when the objects are kept in a confined space (such as a display case, polythene bag or plastic box), where a concentration of the harmful vapour is allowed to build up. Modern organic materials are therefore best displayed in cases that allow air-exchange. In storage they should be wrapped in acid free tissue paper that will absorb the emitted gases, and they should be stored in a separate part of the storage area where there is adequate air exchange.

SUMMARY

It is good practice to always use materials which are as inert as possible in displays and stores, so that they can be re-used when exhibitions are taken down or stores are reorganised. When working with a limited budget the unsafe materials may be replaced gradually, starting with the ones that are used near the most vulnerable items. If there is any doubt about the use of a certain material check with a conservator.

By using safe display and storage materials a safe environment is created for museum objects, which helps preventing further deterioration. This preventive part of conservation is important in the on-going care for museum collections.

FURTHER INFORMATION AND ADVICE

Further information on material that should and should not be used in the storage and display of museum collections can be found in *Museum Methods* (Museums Australia (NSW) Inc) http://www.museumsaustralia.org.au/site/page86.php

and in *ReCollections* (Heritage Collections Council). *ReCollections* is available on-line http://www.amol.org.au/recollections

Museums Australia (Vic) can provide assistance with the location of further information on collections care and conservation for small museums.
Contact: 03 8341 7344 or mavic@mavic.asn.au

Further conservation information can be found on the Australian Institute for the Conservation of Cultural Materials (AICCM) website www.aiccm.org.au

This factsheet has been adapted for use in Australia by Sarah Slade for Museums Australia (Victoria) with kind permission from the Scottish Museums Council.

Handle museum objects

Preventive conservation starts with careful handling. Proper handling is a matter of common sense and relies on understanding the weak areas on an object and thinking through all the risks associated with lifting and moving an object. With careful thought and preparation and a respectful attitude objects, accidents and damage can be avoided.

Objects handling guidelines should be included in procedures manuals and used to train all paid staff and volunteers when they start working at the museum.

General rules

- Ensure that people who will handle objects are properly trained
- Only handle a museum object when necessary
- Stop and think before handling an object. Where are the structural weak points?
- Plan the route and clear the passage before moving an object
- Prepare the space the object is being moved to before handling the object
- Do not hurry
- Use both hands to support the object
- Do not wear dangling jewellery or loose sleeves
- Make sure hands are clean and wear fitted gloves where appropriate
- Do not smoke, eat or drink while working with museum objects
- Do not use pens or sharp objects around objects
- Report and record any damage that occurs during handling
- If a breakage or damage occurs, secure loose or broken pieces in a labeled bag with your name and date

Areas of vulnerability

- Museum objects should be handled with particular care; in many cases they are irreplaceable. Areas of vulnerability include:
- Handles which may be loose or previously repaired
- Protrusions which can catch or be knocked
- Areas of previous repair
- Top or crest rail of a chair
- Soft/powdery surfaces
- Loose components such as drawers, lids, doors, etc.
- Unwieldy shapes
- Large, floppy items
- Heavy items
- Brittle paper
- Ornate or gilded frames
- Paintings which do not have backing boards
- Unframed paintings
- Metal surfaces which are sensitive to tarnishing
- Sensitive surfaces such as photographs
- Gooey/sticky areas
- Lifting/buckling veneers
- Heavy items attached to lightweight items (such as heavy beads on a fine silk piece)

Equipment and materials

There are equipment and materials that can help when handling objects

- Boards for supporting flat, flexible objects such as paper, textiles and beaded objects
- Trays - shallow plastic trays to fit smaller items in
- Trolleys, dollies and pallet lifters for heavy objects
- Gloves - cotton or nitrile. Disposable nitrile gloves are preferable to use with slippery surface such as glass, ceramics and metal as they provide more grip and fit snuggly.
- Copysafe or polyester (Mylar) sleeves - useful for handling single paper items
- Ziplock bags - for smaller, durable items
- Small cushions/tubes filled with bean bag beans - used as cushioning between items in trays
- Foam blocks - used as cushioning or to lift framed works off the floor if stored temporarily against a wall
- Felt covered blocks - lift framed works off the floor if stored temporarily against a wall
- Acid free tissue - used for padding or separating items
- Protectafoam/Cellaire- thin foam used to line trays/boxes or as cushioning around items
- Cotton tape - used to tie loose areas during a move

Planning the move

Inspect the object for areas of weakness

Remove jewellery- rings can scratch, necklaces can swing around

Look at the space you moving to - is it clear? Will the object fit through doors?

Have you got a clear pathway to the new location?

What is the safest way to lift the object?

How many people do you need?

Do you need a trolley?

Do you need a tray?

Have you got padding between objects?

> **You might also like ...**

Connecting to Collections, Objects Handling basics, 2013 [video recording]

connectingtocollections.org/objecthandlingrecording

Heritage & Libraries Branch, Ontario Ministry of Culture, Museum Note #6: Handling Museum Objects, 2005

gov.mb.ca/chc/hrb/pdf/handling_museum_objects.pdf

National Parks Service, Museum Handbook, Chapter 6: Handling, Packing and Shipping, 1999

nps.gov/museum/publications/mhi/chap6.pdf

Exhibit Conservation: Strategies for Producing A Preservation-Responsible Exhibition

BY NANCY JEAN DAVIS

The dual responsibilities of preservation and exhibition, so central to collecting institutions, have often been viewed as contradictory. This Technical Leaflet reviews preservation-responsible strategies that have been used to create an aesthetically pleasing, informative display that also provides a protective environment for the objects.

More detailed information can be found in the National Park Service's 1999 publication *Exhibit Conservation Guidelines: Incorporating Conservation into Exhibit Planning, Design and Fabrication*.[1] This CD-ROM resource includes charts, tables, diagrams and technical information to help implement the general guidelines offered here.

Adopt a Preservation-Responsible Exhibit Process

A preservation-responsible process can be used for an exhibit of any size, whether an historic room setting or a gallery show, and whether the exhibit is handled in-house by a small staff or is designed by a large firm. Integration of conservation concerns into the project is facilitated through a structured process. Involve an exhibit conservator or other knowledgeable collections care professional early in the process. It is usually difficult and costly to correct a problem later in the process. Begin with careful selection of objects that are appropriate for the proposed length and type of exhibit.

Next, establish the specific conditions needed to protect objects selected for display. Collectively called the conservation criteria, these requirements are determined early in the process and then addressed throughout the planning, design, production, and installation of the exhibit. Some of the conservation requirements will be interdependent, and there can be multiple methods of providing any one criterion. Include a series of meetings to discuss progress, consider alternative solutions, and allow time for successful strategies to be developed. Both the schedule and the budget for the exhibit must support a preservation-responsible design.

As opposed to storage, exhibition usually exposes the objects to higher amounts of light and pollutants, more extreme ranges and greater fluctuations in temperature and humidity, and an increased risk of physical damage. It is important to protect the objects during this inherently stressful period by maintaining high standards of collection management. Establish a clean, secure, and environmentally moderate holding area to gather objects and stage their installation. Document the objects completely, including a written condition assessment for every object. Review handling guidelines with each team member, stressing special precautions for handling potential human health hazards such as natural history specimens and radioactive materials. Establish an orderly process for installation and assign one person to have oversight of object handling and movement.

Select an Appropriate Exhibit Team

Many institutions design and produce exhibits using in-house staff, allowing a cooperative working relationship to be built through a succession of projects. Ideally every exhibition team will include a project manager, a designer, a curator, an educator, a registrar, a preparator or installer, and an exhibits conservator. Some may require a security consultant or other specialized member. In small-staffed institutions or for small-scale projects, fewer individuals may comprise the team.

No matter what the size, however, the entire team shares accountability for professional care of museum objects throughout the process. The exhibit conservator establishes the conservation criteria and then works with the designer, curator, and other team members to find practical ways of achieving the recommendations. Whenever a consultant is used for a project, including a conservator or design firm, the contract(s) should clearly state a responsibility to work with the institution to assure long-term object preservation. Include one or more formal reviews by the entire exhibit team at certain points in the process.

An exhibit conservator combines a broad knowledge of preventive conservation with first-hand exhibit experience. Locate an exhibit conservator through the American Institute for Conservation's *Guide to Conservation Services* [2], by talking with other institutions and design firms, or by reviewing publications and lists of conference presenters. Follow up with an interview to establish the conservator's breadth of knowledge and to help anticipate the tone of a working relationship. Finally, check references.

If hiring an exhibit conservator for the project is not possible, assign the role of overseeing conservation concerns to a curator, registrar, or collections manager. Consulting with an exhibit conservator on an as need basis is a practical way for even small institutions on very limited budgets to ensure the most preservation-friendly exhibits possible.

Exhibitions may be designed by institutional staff or a design firm. When an outside design firm is required, select one committed to collection preservation. A firm that believes design elements are more important than the collection is unlikely to achieve a preservation-responsible exhibit. Seek out designers who have a basic knowledge of conservation, have worked with exhibit conservators in the past, and are willing to incorporate conservation concerns into key issues such as case design, construction materials, and lighting restrictions. Interview the curators, conservators, and registrars at institutions that have previous experience with the design firm(s).

Exhibit fabricators and installers must have the experience to build exhibit components, especially cases, according to conservation specifications. Mount-makers and installers not only handle collection objects but construct the mounts which have a direct impact on object preservation. Choose mount-makers with caution; look for those with museum experience and check their references. Insist that the designer and mount-maker confer with the conservator and curator.

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[1] Raphael, Toby with contributions from Nancy Davis. Exhibit Conservation Guidelines: Incorporating Conservation into Exhibit Planning, Design and Fabrication. Washington, DC: National Park Service, Division of Conservation. 1999. (Available for $49.95 from Harpers Ferry Historical Association. (800) 821-5206.

[2] Guide to Conservation Services. American Institute for Conservation, 1717 K Street N.W., Suite 301, Washington, DC 20006 (202) 542-9545.

Define Conservation Criteria

While the curator, registrar, collections manager, and other staff have input, the conservator typically establishes the conservation criteria[3], which set necessary but practical limits on temperature and humidity, light, pollutants, handling, and security. In addition, the conservation criteria alert the designer and preparator to any unique conditions that may affect the handling or mounting of the objects, or that may restrict the length of display.

The conservation criteria must be clear, written, and specific to the objects chosen for display. Generalities can inflict unnecessarily stringent conservation standards, or can miss particularly vulnerable or significant objects requiring unique safeguards. In addition to conducting a condition assessment of each object, the exhibit conservator considers the ambient conditions in the exhibit space and the duration of the exhibit. Although it should be assumed that all team members will work cooperatively to meet the goals, the realistic limits of time and resources available to plan, produce, and maintain the exhibit must be factored into establishing the criteria. For this reason, it is often more useful to establish the degree of sensitivity for each object then identify a range of acceptable conditions rather than an exact goal.

Some objects may be too sensitive or irreplaceable to be displayed, and certain exhibit spaces may be inappropriate for some collections. When the conservation review identifies one object as too fragile or susceptible for even a short period of display, consider using another object or substituting a reproduction or facsimile of the original, such as a color photocopy, a photograph, or a scanned printed image.

Usually, however, thoughtful compromise will arrive at a preservation-responsible way to display even a vulnerable object. For example, rotating objects on display will minimize the light damage and physical distortion suffered during a long-term exhibit. Conservation treatment may be required to stabilize some objects; have a conservator(s) advise on treatment needs early so necessary funds and time for treatments can be secured.

Establish Multi-Level Design Strategies

A preservation-responsible design process relies on the designer, curator, and conservator working together to make conscientious choices and trade-offs. Conservation criteria for controlling climate, pollution, lighting, and security can be addressed both within the overall exhibit space (the macro-environment) and within the more immediate environment around an object, including the exhibit case (the micro-environment). Controlling the exhibit at different levels to fulfill conservation criteria is a cost-effec-

tive strategy. The following example illustrates a multi-level approach for addressing temperature and relative humidity recommendations.

Macro-solutions. Use the building's mechanical system to control temperature and humidity in the overall exhibit space by either adjusting the existing system or by installing additional equipment. This solution provides optimum protection for all objects, but may not be financially feasible. Installation of new ductwork and piping is often problematic in older structures, and maintaining an elevated wintertime humidity can damage building structure.

Micro-solutions. An object's immediate environment can be moderated by locating it away from heating and air-conditioning vents, windows, room entrances, and other areas of rapid air-movement. Avoid over-heating an object by keeping lights at least 24 inches away. Use a well-sealed case(s) to provide a micro-climate for sensitive objects as a low-cost alternative to controlling the entire exhibition space. An exhibit case can also be used when a more stringent environment is required by a few objects, or when different objects need different environments. A case intended to support a micro-climate must be well-sealed, which will add some expense, and require longer design and construction time.

Determine Display Format

In terms of preservation, there is a significant difference between displaying objects in an open exhibit format without protective enclosures, and inside display cases. Open display is inherently stressful for collections and requires special security and increased cleaning and maintenance procedures. Limiting dust infiltration into and moderating the exhibit's macro-environment becomes particularly important.[4]

A conservation-grade case provides physical security and, in addition, can be built to maintain a micro-climate that satisfies stringent conservation criteria[5]. A conservation case, built according to specifications, can buffer collections from rapid changes in the ambient temperature and relative humidity or can provide a specific relative humidity and/or temperature. Dust, chemical pollutants, and insects can be excluded from the conservation case environment and ultraviolet and infrared radiation can be reduced dramatically. Objects of great significance or value can be preserved in an atmosphere of inert gas that essentially stops chemical deterioration processes.

Historic house displays are by nature open formats. Rotating objects on open display and limiting the total length of exposure can limit accumulative damage. As a low cost and effective alternative, consider displaying valuable or sensitive objects in an exhibit case located within the historic room setting.

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[3] Even when a collections staff member sets the criteria, they turn to the conservation literature for guidance. A conservator should review the criteria, especially for objects of unknown or high sensitivity to deterioration.

[4] Although the information outlined in this Technical Leaflet can be used to mitigate problematic conditions in an open format, much of the discussion is geared towards exhibit case display.

[5] Enclosing papers, photographs, and textiles within air-tight frames provides benefits similar to those of a conservation-grade case.

Design Conservation-Grade Exhibit Cases

This leaflet can only summarize the technical aspects of designing a conservation case[6]. For any particular project, the exhibit conservator and designer collaborate to produce a case that meets specific conservation criteria. Fabricators must be provided detailed drawings and specifications to produce a successful conservation case. Building a prototype allows testing and modification to correct design or fabrication deficiencies. One or more mid-production inspections guarantee that conservation features are constructed as specified. Performance testing is recommended on each case before objects are installed. The schedule must allow enough time to evaluate and test the assembled case within the exhibit space.

Conservation-grade cases are either sealed or ventilated. A sealed exhibit case limits the air exchange rate between the display chamber and the ambient environment and thus can be used to create and sustain a micro-climate. On the other hand, objects in a ventilated case are exposed to the ambient temperature and relative humidity of the room, but air entering the case is filtered to exclude dust, insects, and chemical pollutants.

Often the majority of display cases in an exhibit are ventilated, while a few well-sealed cases display objects requiring more stringent environmental conditions. Compared to a more conventional, unsealed exhibit case that undergoes several air exchanges per hour, a well-sealed case can limit air exchange to one in 72 hours.

Precise design specifications and production techniques are required to achieve this decreased air-exchange rate. Construction joints must be tightly built and sealed with a conservation-approved gasket or caulk. Sheets of acrylic and glass have low rates of moisture diffusion and are therefore suitable for constructing well-sealed cases. Plywood, particle-board, and dry-wall, however, have higher rates of moisture diffusion making it necessary to: 1) cover the material with a vapor barrier such as a laminate of melamine and resin-based sheet materials, metal foil, or polyethylene or; 2) seal the material with a moisture-barrier paint. Commercial pre-fabricated, air-tight hatches such as acrylic maritime yacht portals provide convenient access to a maintenance chamber.

Three chambers of a case: display, lighting, and maintenance or control. Isolate lighting fixtures from the display chamber with a transparent glass or acrylic panel sealed with a gasket or caulk. If a micro-climate will be maintained, locate silica gel or equipment in the maintenance chamber. Provide access panels or doors for staff to service the lighting and maintenance chambers.
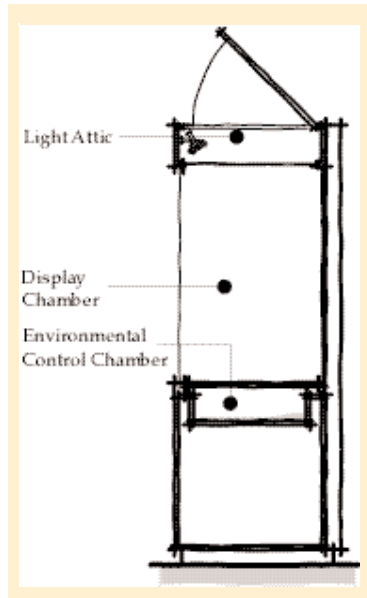
Crank-down cam fasteners form a tight seal for larger access panels or doors.

Although easy to construct, the conventional case with uncontrolled ventilation provides limited conservation benefits. Therefore, even when a micro-climate is not required, it is advisable to construct a moderately-sealed case with controlled ventilation through vents or portholes that are filtered to exclude dust, gaseous pollutants, and insects.

While mechanical fans are sometimes needed in very large cases or to maintain positive pressure, a passive system is sufficient for most applications. Two or more well-positioned portholes in the case panels will promote good air mixing throughout the case interior. Ambient air is filtered as it passes through the portholes into the exhibit case by either: 1) covering the vent with a tightly woven, yet breathable fabric; 2) fastening a pre-fabricated air duct filter to the vent or; 3) fitting a porthole with a commercial respirator filter.

Maintaining a positive pressure within an unsealed exhibit case is another way to exclude dust and insects. When constructing a positive pressure case, no attempt is made to tightly seal joints. One or more muffin fans fitted into a case panel blows filtered air into the case, thus preventing any unfiltered air from infiltrating through seams. As with any ventilated case, the temperature and humidity inside the case will be the same as that in the ambient space.

Create a Micro-Climate Inside a Case

Conservators and designers have developed simple, reliable, and cost-effective methods to protect humidity-sensitive collections in a well-sealed display case. Depending on the conservation criteria, a well-sealed case can be made to either stabilize or control its relative humidity. *Stabilization* evens out or "buffers" fluctuations in the relative humidity, reducing the rate and degree of change that may occur in an uncontrolled exhibition space. The alternative approach of *control* maintains a specific, constant level of humidity.

A case designed to stabilize or control relative humidity must have a well-sealed display chamber and a maintenance chamber to hold the humidity response substance. Air flow between the display and maintenance chambers is created by either: 1) covering a perforated case deck with fabric or another decorative material or 2) using a floating deck panel with a perimeter gap along all four sides. Organic objects, wooden

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[6] Look for similar features when choosing commercially available exhibit cases.
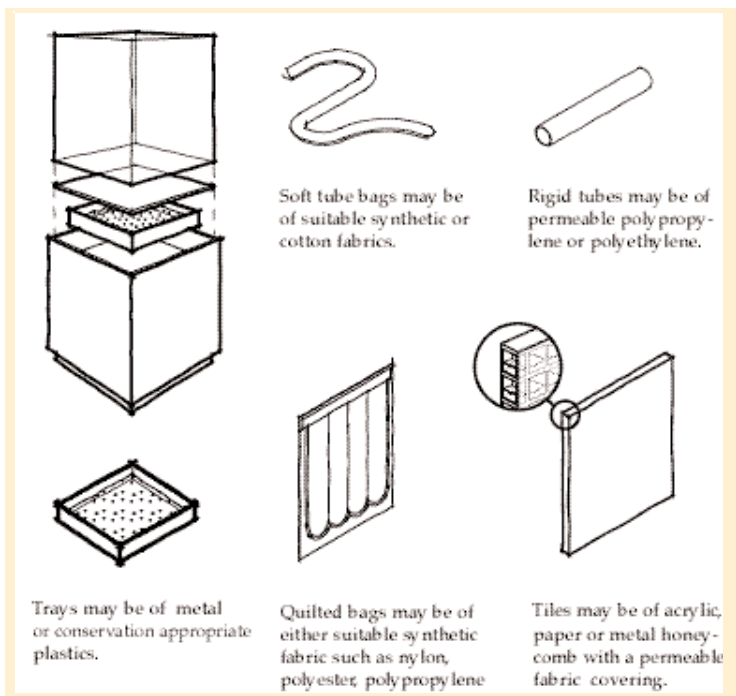
case elements, and paper or fabric liners, release or absorb moisture in response to changes in the relative humidity or temperature. In certain situations, loading the maintenance chamber with cellulose materials, such as cotton, paper, or mat-board can stabilize the display chamber.

More typically, either a mechanical system using humidification units, or a passive system using silica gel is required. A mechanical system uses a small self-contained climate control system to feed conditioned air into the exhibit case, and then either force air out into the room or re-circulate it through the system. For most applications, a passive design for humidity control is effective. Simple passive systems can be built without major expense and need only limited maintenance. The case environment has to be monitored to determine the effectiveness of the control system and to alert staff that a problem exists or that it is time to replenish or recondition the silica gel. Equipment to monitor internal relative humidity includes thermo-hygrometers and data loggers.

Soft tube bags may be of suitable synthetic or cotton fabrics.

Rigid tubes may be of permeable polypropylene or polyethylene.

Trays may be of metal or conservation appropriate plastics.

Quilted bags may be of either suitable synthetic fabric such as nylon, polyester, polypropylene

Tiles may be of acrylic, paper or metal honeycomb with a permeable fabric covering.

Passive humidity control. The maintenance chamber holds either loose silica gel contained in a tray or in mesh bags, silica-impregnated cassettes, tiles, paper, or foams. Generic silica gel desiccant is useful for maintaining relative humidity between 30 and 40%. Newer, hybrid silica gels are better for a middle range of 50 to 60% relative humidity.

Choose Stable Construction and Finish Materials

Exhibition designers can choose from a wide range of non-hazardous materials for constructing exhibit cabinetry and finishing case interiors. The following is a brief overview of current recommendations. Talk with an exhibit conservator regarding specific selection. Unknown or questionable materials require research and/or testing.

• **Adhesives.** Avoid "contact" and "pressure sensitive" adhesives, vulcanized or synthetic rubber-based adhesives, hide glue, and most two-part epoxy and polyester adhesive systems. Less harmful adhesives include acrylic resins and high-temperature hot melt glues. Limit use of adhesives inside the display chamber by wrapping fabrics around solid shapes such as case decks and securing with staples, hand-stitching, and archival-grade double-sided tape

• **Paint systems and varnishes.** Alkyd or oil-based products out-gas for long periods of time. One-hundred percent acrylic latex paints are better choices but can remain tacky in high humidity.

• **Fabrics.** Sulfur compounds in wool damage materials, including silver. Pure cotton, linen, silk, and polyester fabrics without surface finishes or dye are generally non-damaging. Dyed fabrics, which may stain an object during periods of high humidity or accidental wetting, should be washed until the water runs clear. Carpets with a cotton fiber of a short nap are best, but if unavailable, a synthetic fiber should be chosen. Rubber-based backings, often found integrated at the base of the carpet fiber, should be avoided.

• **Foams.** Polyethylene foams that are cross-linked with radiation or foamed with inert gas are the most stable.

• **Wood.** Certain woods such as oak should not be used, while some tropical hardwoods such as Honduran mahogany emit only small amounts of acetic acid. Woods that have been kiln- or oven dried, or steam- or pressure-treated, tend to be more corrosive than naturally aged wood.

• **Engineered Wood Boards.** Plywood and wood-particle boards made with phenol-formaldehyde are believed to be the most stable; specify "exterior" grade plywood with face veneers of grade "A" or "B." Alternatively, use medium density overlay board (MDO), an exterior board with grade "B" face veneers covered with a smooth resin-treated fiber surface that does not need to be sanded. If fire-grade wood is required, specify second generation, non-hygroscopic fire retardants.

When practicality dictates that problematic materials such as wood products be used, prevent outgassing into the display chamber by sealing exposed surfaces with a vapor-impermeable barrier such as a metal foil covered with fabric or a plastic laminate. Out-gassing from the cut edges of plywood tends to be high, so seal construction joints with a conservation-approved caulk. Avoid direct contact between an object and a painted or varnished surface by mounting the object or by isolating it with a layer of inert linen, cotton or polyester fabric, polyester or polyethylene film, acid-free paper, or paper boards. In addition, a pollution absorber can be incorporated into the maintenance chamber of the case.

Control Contaminants Inside a Sealed Case

It is important to remember that any chemicals out-gassing from construction materials into a sealed display chamber will become concentrated. If conservation-appropriate materials are not used to build the exhibit, a case incorporating pollution control may be necessary to provide a safe environment for the objects. Objects that are particularly susceptible to damage by pollutants, for example silver which tarnishes in the presence of sulfur dioxide, can be protected in a chemical-free display chamber.

Activated charcoal and potassium permanganate are commonly used to control levels of chemical pollution[7]. Activated charcoal is relatively inexpensive and absorbs a wide range of pollutants including ozone, sulfur dioxide, nitrogen dioxide, hydrogen sulfide, and formaldehyde. A disadvantage is that the charcoal must be replenished before saturation. If not, it can become a secondary source of contaminants. Potassium permanganate acts as a pollutant scavenger, reacting with and not just absorbing pollutants. A color change in the product indicates when the absorbent must be replaced.

The pollutant absorber can be placed in a contaminant tray in the maintenance chamber below the display deck, hidden behind a large object, used as an impregnated fabric to cover the case floor, or enclosed in a frame package. When necessary, both pollution control and a micro-climate can be provided in the same exhibit case.

Develop a Lighting Plan

Create a lighting plan that addresses both the conservation and aesthetic requirements. Control the macro-environment of the overall room or gallery by excluding or limiting natural daylight by blocking windows or using period-appropriate window treatments, films, or woven fabric. Filter ultraviolet radiation from any sunlight or fluorescent lighting. Select low voltage bulbs to reduce light levels and use diffusers, grids, textured panels, and films to redirect some of the light. Use a rheostat to control the amount of light generated by a lamp.

Consider the lighting conservation criteria when designing the exhibit layout. Provide a gradual rather than abrupt transition between brightly lit areas and those displaying sensitive collections. Light-sensitive objects should be grouped away from exhibit entrances and points of bright light such as windows. Reduce needless exposure to light when the space is unoccupied by using motion sensors to activate some or all of the exhibit lights. Unnecessary damage from case lights during non-public hours can be eliminated by providing a separate set of lights for cleaning and maintaining the gallery. In general, maintain at least 24 inches between the lamps and the objects.
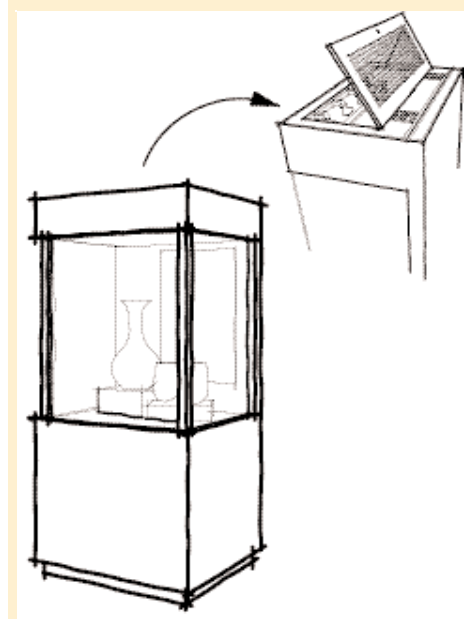
Integral case lighting. Isolate case-mounted lighting fixtures and lamps in a separate lighting chamber. Dissipate heat from the lights with vents; electric fans may be required, especially in a large case. Use a heat-reflecting glass for the transparent layer between the lights and display chamber or use double-glazed construction.

Design and Fabricate Protective Exhibit Mounts

Improperly designed or constructed mounts can scratch, bend, discolor, corrode, or otherwise damage an object. Allow for the time-consuming process of careful mount-making in the installation schedule, as well as in the exhibition budget. While the exhibit preparator usually makes the majority of mounts, there are many types of preservation-responsible mounting techniques. Discussing options with a conservator may lead to a new approach. It is particularly important to consult the conservator regarding vulnerable and problematic objects.

If there is not enough time to safely mount all objects, select different objects or use generic mounts. Even when generic mounts such as commercially available book cradles, boxes, pedestals, and ring stands are purchased, some time and skill will be required for fine adjustment. For example, additional cushioning material may be needed to evenly support a particular object. Original clamps, hooks, strings, or straps attached to objects should not carry any weight but, instead, need a support of their own. Objects should not be suspended by wires or monofilament unless the point of contact is padded.

Custom mounts designed for specific objects are made from a rigid acrylic sheet, e.g., Plexiglas, brass rod and strap, and blocks of high-density foam. Examples of custom mount types include metal rod "T" mounts, metal rod "spider" mounts, drop mounts or rod and sleeve mounts, pin mounts, straps and clips, and mannequins or partial three-dimensional

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[7] Acid-free, alkaline reserve papers or boards in a frame can provide similar filtering benefits because the paper will absorb pollutants as the air passes through the paper fibers. The effectiveness and longevity of this technique is, however, difficult to quantify.
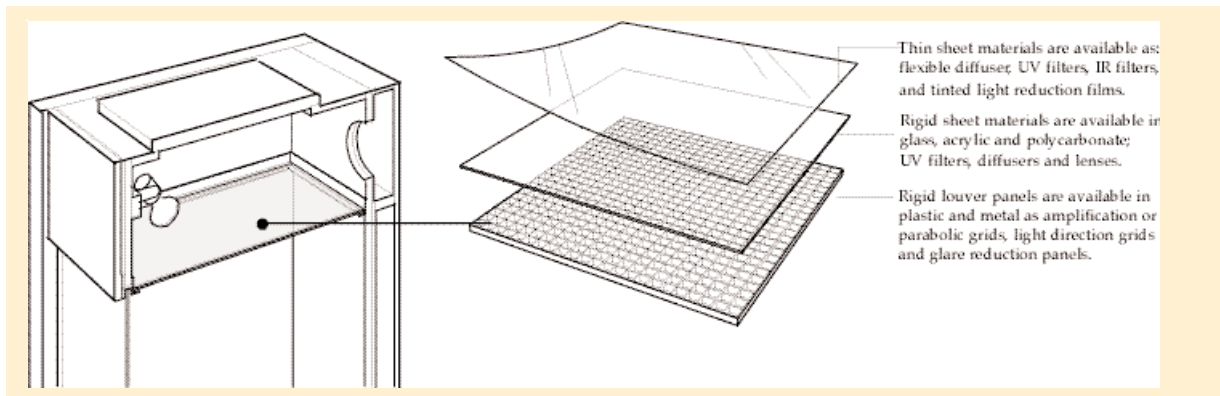
Reduce the amount of light and heat passing through the glazing panel with filters and light-directing and -controlling devices. Using metal rather than wood to construct the lighting chamber will help dissipate heat.

forms. Edges of plastic and metal mounts are always filed and polished, and may be cushioned or coated with a barrier such as an acrylic resin or paint, or with a silicon rubber.

Pad out textiles, leathers, and other fiber-based materials to prevent creasing, tearing, and deformation, and avoid layering objects on top of one another. Polyester batting or polyethylene foam, covered with muslin fabric, can be contoured over a wooden or metal support to make appropriately-sized mannequins and similar forms. Muslin linings and backings can reinforce and protect garments and hanging textiles but usually need to be applied by a qualified conservator. Quilts and similar flat textiles can be hung by inserting a metal or wooden rod, sealed to prevent direct contact with the textile, through a muslin tube that is pre-sown along one edge of the textile. Alternatively, Velcro can be used to mount a flat textile; one side of the Velcro is sown to a backing material which is hand-stitched to the textile.

Reproduce original photographs for display, then store the originals and copy negatives. Displaying photocopies of original paper documents is an excellent preservation technique. When an original paper item must be displayed, it can be archivally framed or encapsulated using a backing board of acid-free mat board and a polyester cover sheet.

Prior to display, any original image framed in acidic mats or with wooden backing boards must be reframed using archival products that are acid-free, sulfur-free, and water-fast. Sealing a frame package acts to stabilize the relative humidity inside the package, and the seal will discourage water from entering the frame during a disaster. Use bumpers on the back corners to create an air-space between frame and wall.

Inspect the physical security of all frames and replace screw eyes with metal strap "D" hooks. Use braided steel wire and picture hangers with tempered steel nails to suspend frames, preferably from individual points on both side members. Make sure that the wall fastener is securely anchored to the wall and can support the weight of the framed object.

Protect Objects During Production and Installation

Exhibit construction generates dust and chemical pollutants that must be minimized and contained. When feasible, limit dust by altering construction techniques, for example by pre-cutting all boards in the workshop and using collection bags to contain dust. Confine the dust by blocking off the area under construction with plastic sheeting or temporary walls. Finish drywall by smoothing with damp rags or sponges instead of sanding. Keep areas clean with a high-efficiency particulate vacuum cleaner.

A hurried production phase creates an inherently hazardous environment for collections. Even if an exhibit is behind schedule, sufficient time to complete construction and to safely mount all objects must be allowed. Before installation of objects can begin, construction of the exhibit casework must be finished, and the cases and general exhibit space aerated, preferably for three weeks. Conservation treatments have to be completed, and the performance of any environmentally controlled exhibit cases evaluated and refined.

Installation of exhibit objects is a critical phase for object preservation. Assign the responsibility of overseeing the handling and movement of objects to one person. Proceed in an orderly manner, allowing ample time to install and mount the objects. Design and, as far as possible, make mounts in advance.

Final adjustments of lighting intensity and angle occur late in the installation process, usually after objects are installed. As long as conservation criteria have been respected in the design and production of the exhibit, these last minute adjustments present few problems. Because even a slight change in the aim of a light affects the amount of radiation reaching an object, however, it is necessary to use a light meter to monitor levels.

Maintain Conservation Features in the Exhibit

The preservation-responsible exhibit process does not conclude with the exhibit opening. The design team should meet to evaluate the process, including how successfully the conservation criteria were addressed. Such a critique can reveal important lessons and identify successful strategies.

A written maintenance manual is an essential product of a preservation-responsible approach to exhibition planning and production, enabling staff to maintain the conservation criteria. Include plans and descriptions documenting the exhibit components and cabinetry; for example, how cases open. Provide instructions for reconditioning or renewing humidity adjusting substances, replenishing exhausted pollutant absorbers, changing filters in the heating and air-conditioning system, and cleaning the exhibit space and case interiors. Detailed lighting information is required, including the lamp types, wattage, and angle of direction. Establish schedules for object rotation or substitution, and note any restrictions or cautions, such as special procedures for loan objects. Use an Exhibit Maintenance Checklist to help administer the necessary tasks.

A daily inspection during the course of the exhibit will identify theft or vandalism and ensure that the objects remain securely mounted and free of infestation or other hazard.

In addition to the objects themselves, the environment in the exhibition space or specially-designed cases must be monitored. Humidity-controlled cases and pollution-control systems require scheduled maintenance, and spent lamps must be replaced with those of the same wattage, beam width, color-temperature, and filtration. Provide a budget to maintain these exhibit conservation features.

Summary

This Technical Leaflet introduces a preservation-responsible approach to producing exhibits. The conservation criteria establish safeguards necessary to preserve the specific objects chosen for the exhibit. Consider conservation early. It is more difficult and costly to alter the exhibition design later in the process. Establishing the criteria early in the process allows preservation requirements of the objects to be addressed from the initial conceptualization of the exhibit.

Once established, the conservation criteria become a touchstone during the four stages of the exhibition process: planning, design, fabrication, and installation. Institutions are urged to utilize their own in-house conservation staff, or to consult with a private conservator or conservation facility with experience in exhibit conservation. Open communication between the designer, curator, and conservator achieves a balance between the conservation needs of the objects and the practical requirements of producing an exhibit on budget and within a demanding time frame.

Drawings by Kevin Brookes taken from: Raphael, Toby with contributions from Nancy Davis. *Exhibit Conservation Guidelines: Incorporating Conservation into Exhibit Planning, Design and Fabrication.* Washington, DC: National Park Service, Division of Conservation. 1999.

Resources

CCI NOTES and Technical Bulletins. Canadian Conservation Institute, Canadian Heritage. Canadian Conservation Institute, 1030 Innes Road, Ottawa, Canada, K1A 0 M5, Canada.

Environmental Conditions for Exhibiting Library and Archival Materials. NCANSI/NISO Z39.79.199X. NISOPress Fulfillment, PO Box 338, Oxen Hill, MD 20750-0338.

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