

<https://www.loc.gov/preservation/resources/rfs/RFS%202021-2022.pdf>

<https://www.nytimes.com/2013/05/29/booming/tips-on-archiving-family-history-part-1.html?searchResultPosition=1>

[https://www.loc.gov/preservation/digital/formats/intro/format\\_eval\\_rel.shtml](https://www.loc.gov/preservation/digital/formats/intro/format_eval_rel.shtml)

Kids today are “born digital” so why would time capsules not be digital. Do both!

## The ITCSOC recommendation

Decide on your Capsules purpose	<p>Your characteristics – your likeness, expressions</p> <p>Your story – your experiences</p> <p>Daily Life – a glimpse of our life and times</p> <p>History – capturing the history of our times</p> <p>Celebrating an occasion</p> <p>science</p>
Name your capsule	
Involve your class	Invite the ITCSOC for a presentation – learn about the history and science of time capsules, preservation and decomposition – Science / history / fun.
Select retrieval date	<p><b>Decide when to open</b> your time capsule. If you are doing a class capsule, pick a reunion date with your class (the retrieval date) that has meaning</p> <p><i>Physical capsules and do-it-yourself digital</i> <b>Tell 3 people</b> you trust in different locations when you want the capsule opened – and set an annual renewal in your and their electronic calendars to remind you of the event.</p> <p>Mark the opening date on the outside of the cylinder</p> <p><i>Digital</i> : create your time capsule through a time capsule company and let them actively manage your opening date for you. You will receive annual reminders.</p> <p><b>Register</b> your time capsule with the ITCS</p>
Select a container - physical and digital.	<p>The container can be digital or Physical or both. The ITCSOC recommend making both a digital and physical time capsule together to best capture your likeness and stories.</p> <p><i>Physical</i> Select a container that is non-rusting, strong, waterproof that can be sealed tightly. We recommend seamless stainless-steel container with a lid that screws on with an o-ring gasket or a stable plastic jar of uncoated polyethylene (PET or PETE, recycle code 1) jar with a screw-top lid of the same material</p> <p><i>Born Digital – you need THREE copies</i></p> <p>Use latest digital and open format formats</p> <p>Put a USB into the physical and maintain TWO separate copies in two separate locations in two different media (cloud, hard drive and USB).</p>

	<p>Digital time capsuling companies will usually maintain these multiple copies for you (always check they do this) at a price.</p>
Secure items for storage.	<p><b>Decide</b> what to include. Items and files must serve your purpose (see above) Decide what is most important to you, which information characterizes you and what information has enduring value or information that has long-term value to you and your family.</p> <p><i>Digital:</i> Review Audio, Video, photos, emails, websites, documents Save in the highest possible resolution always Audio (music or voicemails) WAV or MP3 Video use open formats like MPEG-2 (.mpg, .mpeg) and MPEG-4 (.mp4) Photos TIFF (*.tif), JPEG2000 (*.jp2), PNG (*.png), JPEG/JFIF (*.jpg), BMP (*.bmp)</p> <p><i>Physical</i> - look through the list of materials to avoid and how to separate items from each other! Especially avoid PVC-based, no food, plants, food plastic, hair, or wool. Keep everything separate</p>
Create a list of your inventory	<p>Create a list of “inventory” in your physical and digital time capsules. Make two copies of this list, store one in your time capsule. Keep the other. Include WHY you have saved that item.</p> <p><i>Digital Time capsuling companies should maintain this for you</i></p>
Select your location	<p><i>Physical</i> – cool, dry, dark, off the floor. Avoid basements. Do not bury outdoors</p> <p><i>Digital</i> You should have three locations for your capsule – a digital time capsule company will maintain this for you and will update them for you. If your capsule is designed to last more than 5 years – ITCSOC recommend you use professional digital preservation with a time capsuling company. If you can’t, each of the three copies should be to a current storage medium about every five years. Put in reminders with your “trusted people”</p> <p><i>For very long term capsules</i> Let's say you leave behind a record of its exact latitude and longitude. That will shift over the next thousand years, thanks to changes in the earth's axis and continental drift. As the plates in the earth's crust move apart, Europe and America will drift away from each other. By the year 3000, the coordinates of the capsule will have shifted by as much as 60 feet. You'd have to project what the future coordinates would be.</p>
Have a sealing and burial ceremony	<p>Let your “trusted people” create a password on your digital file folder so you can't access it until the retrieval date (see instructions below)</p> <p>Set an annual renewal in your and their electronic calendars</p> <p>Frame your ITC certificate at your home or school so you are reminded</p>

Mark the location	<p>Tell at least three different people who live in different locations the exact address and GPS or the digital formats and how to read them. Use a trusted family members smart phone to get the GPS coordinates</p> <p>Register this with the ITCS</p>
Register your capsule	<p>Register this with the ITCS</p> <p>Digital time capsule companies will also send you reminders of opening dates</p>

## DIGITAL TIME CAPSULES

Our digital lives are as much a part of us today as our physical lives

The most fundamental impulse that drives collecting institutions like archives, museums and libraries: memory. How do societies document evidence and information about the past in such a way that will be useful for their members in the present as well as for anyone at anytime in the future? How do families pass down their knowledge, experiences, histories and legends from one generation to the next? People have been successful at this endeavor for centuries and centuries. Different groups in different times have employed a diverse set of available technologies to communicate to future generations, including oral traditions, written traditions and documentary recording media (still images, sound recordings and moving images). Today our digital lives are as much a part of us today as our physical lives

“We need to share stories; we need to write to each other, and about each other; and we need to record our voices and our likenesses. We cannot preserve everything. And not everything needs to be preserved. But the more we talk, the more we write and the more we document, the better chance some fragment of our expressions and experiences will make its way to our descendants.”

IDENTIFY	<p>Audio, Video, photos, emails, websites, documents</p> <p>Identify all your media – consider cameras, computers, phones and removable media such as memory cards. Include your videos on the Web.</p> <p>Identify personal e-mail accounts. Within each account, find all folders or other separate groupings of messages; include any "archived" messages.</p> <p>personal websites and social media sites and services.</p>	
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	<p>resumes, school papers, financial spreadsheets, presentation slides or other digital documents.</p> <p>You might also have digital copies of original hard copy documents such as letters, maps or family histories.</p>	
SELECT and unify under one roof	<p>Decide what is most important to you, which information characterizes you and what information has enduring value or information that has long-term value to you and your family.</p> <p>For information that may have enduring value. For this type of information it is important to decide which documents to save. Think about different versions, such as drafts and earlier copies. Drafts, for example, can provide important details that do not appear in final versions.</p>	
	If there are multiple versions of the same file save the highest quality version	
	Digital audio save recordings in an open format.	
	<p>Digital Photos DO</p> <p>Use TIFF</p> <p>Save the highest possible resolution</p>	
	Digital Video Technical file quality is an important consideration for digital video. Save the highest quality versions of your videos along with good descriptive information about them.	Videos that are posted on the Web are often grainy and have less information than the original version.
<p>Create a consistent organizational structure.</p> <p>Metadata is information about the what, who, when, how, why and where regarding any given object, idea or event. Therefore, metadata plays an essential role in the personal/family archive.</p>	<p>Create a main archive folder and title it something like, "My Archive." If you want to organize your files further, create other folders inside the master folder and name them with simple titles such as "video," "photos" or "documents."</p> <p>Label media properly and keep in secure locations (such as with important papers).</p> <p>Give individual videos descriptive file names.</p> <p>Tag videos with names of people and descriptive subjects.</p> <p>Write a brief description of the directory structure and make at least a preliminary inventory of your files. Use a spreadsheet instead of a text document so that the data is standardized and can be imported into other formats</p> <p>Create a directory/folder structure on your hard drive that allows you to organize your images in a way that</p>	<p>You cannot write on the back of a digital file, as we all know. But you can write in the digital file. And you can keep supplemental information about the digital file in spreadsheets and databases and other electronic forms. I think it is important that we all independently think about the methods through which we will share essential information about our digital collections with future generations.</p>

	<p>makes sense to you. Some examples are:</p> <ul style="list-style-type: none"> <li>o Date-based: 2010/05</li> <li>o Event-based: Vacations/New York City 2009</li> <li>o Combination: 2010/05/New York City Vacation</li> </ul>	
MAKE COPIES	Have at least <b>two separate copies</b> of your content on separate media—more copies are better.	
	<p>Use <b>different kinds of media</b> (USB, Cloud, DVDs, CDs, portable hard drives, thumb drives or Internet storage); use reputable vendors and products for the media</p> <p>One copy can stay on your computer or laptop; put other copies on separate media such as DVDs, portable hard drives, or Internet storage and store the extra copies in different geographic locations.</p> <p>A digital time capsuling company can do this for you</p>	
Manage them in different places	<p><b>Store media copies in different locations</b> that are as physically far apart as practical.</p> <p>If you are doing it yourself, give the copies to different people – or put one copy in your physical time capsule and copies to other people</p> <p>A time capsuling company can do this for you</p>	
	<p>Create new archival media copies at least every five years to avoid data loss</p> <p>If you are doing it yourself, make sure the people with the copies do this for you</p> <p>A time capsuling company can do this for you and is recommended</p> <p>Archivists and conservationists might also be able to do this</p>	
	Be sure not to assume that a searchable system will provide preservation.	
Set an opening date	Get someone to apply password you don't know	
Password encryptions	<p>Select all the files that you want to protect with password.</p> <p>Right click, Go to 7-Zip option in right click context menu.</p> <p>Now select Add to archive option.</p> <p>A small Add to archive window will open, Put your password in the Encryption section.</p> <p>Click OK.</p>	

# DIGITAL FORMATS

Preferences among digital formats will be based on a balance among the factors: disclosure, adoption, transparency, self-documentation, external dependencies, impact of patents, technical protection, quality, and functionality. Sometimes these factors compete. For example, some formats adopted widely for delivery of content to end users are proprietary or apply lossy compression for transmission over low-bandwidth networks. Disclosure can substitute for transparency; for example, the developers of the JPEG 2000 format based on wavelet compression are said to have tested the published specification by giving it to several programmers independently and asking them to program a compliant viewer based only on the specification. For content of high cultural value and for which a special functionality has particular significance, the ability of a format to support that functionality may outweigh the sustainability factors.

[https://www.loc.gov/preservation/digital/formats/intro/format\\_eval\\_rel.shtml](https://www.loc.gov/preservation/digital/formats/intro/format_eval_rel.shtml)

<http://ohda.matrix.msu.edu/2012/06/digital-video-preservation-and-oral-history/>

Photos and images	<p>Choose the highest resolution available, not rescaled or interpolated</p> <ul style="list-style-type: none"><li>• Highest bit depth available, 16 bits per channel if available</li><li>• Embedded color profile or specified color space used in published version</li><li>• Uncompressed</li><li>• Unlayered<ul style="list-style-type: none"><li>• Clarity (support for high image resolution)</li><li>• Color maintenance (support for color management)</li><li>• Support for graphic effects and typography</li><li>• Support for multispectral bands</li></ul></li></ul> <p>Recommended TIFF (*.tif)</p> <ul style="list-style-type: none"><li>• JPEG2000 (*.jp2)</li><li>• PNG (*.png)</li><li>• JPEG/JFIF (*.jpg)</li><li>• BMP (*.bmp)</li></ul> <p>Acceptable <a href="#">Scalable vector graphics</a> (*.svg)</p>	
Audio	Music / Audio files should be saved in open, non-proprietary (meaning the format is not owned by a	Fidelity (support for high audio resolution)

	<p>particular entity) and popular file formats. This will ensure the most flexibility for future use</p> <p>convert them to, more open formats such as WAV or MP3</p>	<p>Support for multiple channels (including note-based, e.g., MIDI)</p> <p>Support for downloadable or user-defined sounds, samples, and patches</p>
Video	<p>Video formats that are widely-supported, documented, and open standards will have a much greater longevity than those proprietary formats subject to frequent change</p> <p>Video files should be saved in “open” and popular file formats. Using these will ensure the most flexibility for future use. In practice, however, this can be difficult, as encoding video files in open formats is not always easy if your camera or video editing software does not allow for it. In general, open formats like MPEG-2 (.mpg, .mpeg) and MPEG-4 (.mp4) are good choices for your digital video files</p> <p>It is also important to maintain original, high-quality files in their native codec and resolution.</p> <p>Long-term retention of proprietary video formats is not recommended. These formats change frequently, playback is limited to specific software, and the source code is not documented so that others can write codecs to read the files. If you have created or acquired proprietary video files as your primary preservation format (this includes Apple ProRes and AVID DNx), you may want to consider migrating these files to a more preservation-friendly file format.</p> <p>Acceptable: ProRes a. QuickTime (.mov) container b. 4444 (XQ), 4444 or 422 HQ codecs 3. MPEG-2 a. Compliant with ISO/IEC 13818 4. XDCAM a. MXF b. HD422, SHD422, HD codecs</p>	<p>Clarity (support for high image resolution)</p> <p>Fidelity (support for high audio resolution)</p> <p>Support for multiple sound channels</p>
A Note on cloud	Choose cloud services owned by the biggest companies who are likely to have persistent backups, and will likely to survive as part of other corporations even if they no longer exist: Think Google, Microsoft, Apple, Amazon.	
USB	The stored charges of the bits of information slowly decrease in time.	

	The JEDEC Solid State Technology Association sets basic industry standards for things like flash chips. JEDEC JESD218A endurance specification requires a flash memory chip that's turned off and stored at 25C to retain data for 101 weeks. Not even two years.	
	along with a media copy in the capsule, you may want to store a digital copy on your servers (and LTO backup tape), as you could pack the software to open the files into an encrypted file with the key stored physically in the capsule	
M-Disc	M-Disc - according to their website is rated at 1000 years. But a pricey option	

## PHYSICAL CONTAINERS

### WHAT TO INCLUDE IN PHYSICAL CONTAINERS



Careful consideration of what to include in the container

Deterioration of one material in the time capsule can lead to deterioration of the other materials contained in the time capsule, since they are in a limited, closed space together.

Minimize the risk of unexpected chemical interactions among the time capsule contents by packaging each item: put each item or group of like items in acid- and lignin-free paper envelopes, folders, or boxes; uncoated PET zipper bags; or glass or PET, HDPE, or PP plastic vials with screw-top lids

Glass items	DO INCLUDE	
stone; ceramic;	DO INCLUDE	
non-corroding metals	DO INCLUDE	
Coins	Wrap in anti tarnish cloth and place in a foil and plastic bag	
Books	DO get a storage container that lays horizontally and that encloses the book entirely. It also needs to be made of acid-free and lignin-free materials. Also 100-percent-cotton fabric to wrap the book before it is stored in the box.  Keep it out of the light entirely and keep it in a cool, dry space.	thereby prolonging the life of a book up to 300 percent, as proven in tests conducted by the Conservation Division's Research and Testing Laboratory.



	Deacidification with a nonaqueous spray that neutralizes acid in paper and leaves an alkaline reserve	Heat, light and moisture all speed the decay of cellulosic materials (which is what the paper of the book is made of).
Videos	Include instructions on any intended playback equipment. For computer tapes, add a written copy of the software, and identify the computer type.	include video or audio tapes or compact disks, the equipment to play them back may not be available when the time capsule is opened. Furthermore, the tapes or disks may have deteriorated.
CD's	Plastic and foil envelope Create a capsule in a capsule	The problem of plastics is compounded if a plastic object is the medium for information (as with CD's or video tapes).  CD deteriorating may compromise the environment so shield other objects from the harmful effects of any gases they may emit through the years.  Off-gassing caused by degradation of the plastic CD or the low-grade plastic ID and wallet cards could cause coins and other metals to pit and corrode
		machine-readable media such as a CD or computer disk or videotape usually need to be eliminated because playback equipment probably will not be available in 100 years.
Printed Items and Documents	<p>items printed or written with carbon-based ink on acid- and lignin-free, good quality paper;</p> <p>they should be placed in archive quality, acid-free paper products and boxes.</p> <p><b>Make a preservation (long-lasting) photocopy / What is a preservation photocopy?</b>  Use paper that meets the <a href="#">ANSI/NISO standard Z39.48 - 1992 (R2002)</a>  for <a href="#">permanent paper</a>  ("Selections from <i>North American Permanent Papers</i>," <i>Abbey Newsletter</i>), in an electrostatic photocopying machine with well-fusing toner containing carbon black as the pigment. See <a href="#">Archives: Preservation Through Photocopying</a> [PDF: 891 KB / 4 p] (National Park Service) and <a href="#">Archival Copies of Thermofax, Verifax, and Other Unstable Records</a> (National Archives and Records Administration).</p>	<p>plastics are not the best thing to store old documents in</p>

	A simple <a href="#">peel test</a> can help determine whether the machine and toner produce a well-fused image ("Testing Electrostatic Copy Quality: The Peel Test," National Archives and Records Administration).	
Photos	<p>Fiber based Black and white are better Interleave the photos or sleeve them with archival quality photo envelopes.</p> <p>Certain plastics are highly recommended for long-term storage. If photos are involved, make sure the product has passed the Photographic Activity Test (PAT).</p> <p>DO treat with gold, selenium or poly-sulfide toner</p> <p>DO Remember to also document what the contents are. If there are people in photographs, document them.</p>	<p>Color prints and slides can fade even when kept in the dark. To keep photo emulsion surfaces from sticking together</p> <p>If so, most products will advertise this fact.</p>
Photographic films	Photographic films coated on a polyester base rather than an acetate base	Polyester bases are more stable.
Newspapers	DO make photocopies on archival quality paper (high-alpha cellulose) with an alkaline reserve of pH 7.5-8.0.	Newsprint is acidic and deteriorates easily. A local museum or library should have names of paper conservators.
Objects made of rubber	should not be placed in time capsules	since rubber deteriorates over time, releasing sulfur.
Wood objects	Must be sealed away from electronic equipment or metal articles, especially those made of lead, or lead-containing alloys, in the time capsule.	All wood, especially oak, gives off acid vapors
Textiles	<p>Textiles made of non-plastic fibers are best; should be clean and insect free.</p> <ul style="list-style-type: none"> <li>- Cotton: Acts as a humidity buffer if temperature changes.</li> <li>- Polyester: Stable.</li> <li>- Silk: May deteriorate in oxygen atmosphere.</li> </ul>	
Hair (and wool)	DO NOT INCLUDE unless in a glass vial	Contain sulfur; may outgas and corrode metal.

List of objects	DO INCLUDE A complete list of contents describing color and material of every object	Since objects can change over time.
Plastic items made of uncoated PET, HDPE, or PP plastics (polyethylene, polypropylene and polyester.)	CAN BE INCLUDED The key with plastics is to avoid PVC-based polymers and to avoid any type of plastic that off-gases to a dangerous degree. Three forms of plastic that are regularly used in preservation scenarios are polyethylene, polypropylene and polyester. Look for archival storage products that are composed of one of these three polymers.	
Polyvinyl acetate (PVAC) or PVC, including plastic food wrap	DO NOT INCLUDE	will deteriorate even in a sealed capsule and release acetic acid and hydrochloric acid, respectively, as they age. Because the aging characteristics of some plastics are not good and others are not truly known, these materials cannot be counted upon to survive in their original form.
FOOD	DO NOT INCLUDE	
PLANTS	DO NOT INCLUDE	

## PACKING THE TIME CAPSULE

Group materials by classes, with a separate compartment for each. Similar kinds of papers in one, plastics in another, other substances in a third.

1. wrap each item in acid-free tissue. Labeling these enclosures in pencil would be useful to the intended future audience.
2. Put heaviest items at the bottom;
3. Prevent items from rattling around;
4. Ensure the weight of the contents within the time capsule container is evenly distributed;
5. Indicate on the outside of the container which side is up
6. Include opening instructions
7. Label the outside of the capsule clearly with a permanent material;
8. write out links to your where your media is stored using paper and ink that is likely to survive in the timecapsule.
9. Use Indian Ink, Black Pencil - write on plastic, metal and archival paper sealed in plastic. These media are already proven to last!
10. create a checklist of the contents in duplicate (one copy for the time capsule enclosure and one file copy);
11. insure that a record of the time capsule along with the contents list is kept in several places.

# THE LOCATION

A good place to keep the storage container

KEEP DRY  Silica Gel / ART-SORB	<p>A room which is relatively dry (about 35% relative humidity)</p> <p>Do include Silica It must be conditioned to a low humidity level before use.</p>	<p>Silica gel will help to buffer the humidity in the capsule. It is sold in granular form in art supply stores, hardware stores, and some department store closet shops.</p> <p>ART-SORB, a more costly but easy-to-use form of silica gel is available from conservation suppliers.</p>
ABSORB OXYGEN AGELESS	<p>This product locks up oxygen that might leak into the capsule.</p> <p>DO : use just before sealing</p>	<p>"Ageless" is sealed in a packet that is oxygen permeable. It should not be used until just before sealing the container and should not be placed near heat-sensitive items. "Ageless" is available from conservation supplier</p>
PROTECT THE VESSEL	<p>A time capsule going into the ground may be placed inside a burial vault for added protection, or coated with asphalt- or pitch-impregnated fabric to keep out water.</p>	
COOL	<p>A cool room is best (room temperature or below)</p> <p>Maintain distance from radiators and vents</p> <p>Placed northerly or otherwise sheltered from extreme fluctuations in temperature caused by sun heating</p>	
AVOID VIBRATION		
DARK	<p>Minimal exposure to all kinds of light; no exposure to direct or intense light</p>	
STABLE	<p>stable environment (avoid attics, basements, and other locations with</p>	

	high risk of leaks and environmental extremes)	
OFF THE FLOOR	preferably off the floor.	
BURY IT	Not recommended but If you bury it, you should create a pattern of iron magnets around the capsule.	That will suggest some kind of purpose to anyone who stumbles upon it

## A good physical storage container

	Select a container that is non-rusting, strong, waterproof that can be sealed tightly	It must will keep out light, dust and other air-borne pollutants, and water
SEALS	Seals are critical; butyl or propylene gaskets are currently favored.  DO NOT weld it shut  DO NOT soft soldered	because it can heat the capsule's contents  solder can deteriorate in the ground allowing water to enter the capsule.
Metal Containers for a minimum of 100 years.	Stainless steel capsule  DO seamless stainless-steel container with a lid that screws on with an o-ring gasket  SS takes a long time to corrode and is extremely durable..	The o'ring / gasket will seal it  In the United States, we use SS to store plutonium
	DO Displace the oxygen in the container with an inert gas such as argon or nitrogen	Oxygen causes things to deteriorate. Oxygen displacement is the same system used to preserve the nation's founding documents.
Copper	DO NOT use copper panels soldered together with a silver-lead compound and a lid welded on with a blowtorch.	Solder degrades. The solder will break down and moisture and atmospheric pollutants seep in, harming the contents.
aluminum	aluminum or stainless steel cans with matching screw-top lid;	

PVC Pipe	DO NOT use polyvinyl chloride (PVC) pipe for time capsules	Some of its chemical components are naturally unstable and break down in a process that cannot be reversed and will release acids into the canister.
Polyethylene pipe	<p>You could use polyethylene. It's a plastic with a very high carbon content, which makes it almost impervious to sunlight. And you can seal the seams with nothing more than heat. Uncoated high-density polyethylene (HDPE, code 2) or polypropylene (PP, code 5);</p> <p>End-caps on large diameter polyethylene pipe can be heat-sealed; threads in caps can be filled with thin Teflon tape.</p> <p>Encased in a waterproof enclosure if buried in the ground.</p>	Polyethylene may become permeable to moisture as it ages, so it must be encased
or a stable plastic jar	<p>Chemically inert, e.g.: uncoated polyethylene (PET or PETE, recycle code 1) jar</p> <p>DO have a screw-top lid of the same material</p>	
Cardboard boxes	lignin- and acid-free cardstock boxes with snug lids	These will keep out minimal, incidental water only