Freeze Treatment of Organic Materials for Pest Management

Natural history museums use freezing as an effective way to prevent insect pest infestations and reduce the need for application of chemicals such as pesticides.

FREEZING PROCEDURE

Follow the procedures below to freeze organic materials. See Material Notes section for more specifics on certain items.

Bag it!	Place item in a heavy-weight plastic garbage bag or a freezer grade Ziploc bag (depending on size of object). Remove as much air as possible from the bag and seal. Some materials are detrimentally affected by condensation, which can be produced during the freeze treatment. Protect more sensitive materials by placing them in between layers of archival blue board or in a cardboard box. 
Freeze cycle 1.	Mark with date. Place in the freezer for the first freeze cycle. With standard freezers, **four days is best** for most materials. A *minimum* of 48 hours is required. Larger or denser items require longer freeze periods. 
Thaw cycle 1.	Remove item from freezer, leave bagged, and let it acclimate to room temperature for at least 24 hours.
Freeze cycle 2.	Mark with date. Place in the freezer for the first second cycle. With standard freezers, **four days is best** for most materials. A *minimum* of 48 hours is required.
Thaw cycle 2.	Remove item from freezer, leave bagged, and let it acclimate to room temperature for at least 24 hours.
Unwrap and inspect.	After the item has acclimated to room temperature again, remove the item from the bag. Check for pests in the bag and on the item. Document any pests found. Discard the bag. Clean the item of any pest residue.
Use!	You're free to use the item!

MATERIAL NOTES

Leaves, twigs, pinecones	Clean off as much debris as possible (dirt, etc). Bag materials in smaller quantities. Leave enough space in between things for the material to freeze well.
Tree logs	Smaller to moderately sized logs must be frozen for a minimum of two weeks for each freeze cycle. Large logs are not able to be processed through our existing freezers. Logs need to be bagged and placed in isolation for a week following completion of the freeze treatment to monitor for any emerging insects. Logs may need to be chemically treated with a pyrethrin or borax spray.
Pressed plant specimens, paper documents	Must be completely dried prior to freezing. Stack plant specimens mounted on botanical sheets or loose in between paper sheets. Place the stack in between cardboard sheets and bag. For paper documents (archives), process in full cardboard box, bagged.

Freezing is safe for most materials. Some materials, however, should not be frozen. These include:

- oil and acrylic paintings on canvas
- ceramics
- wooden frames, lacquered wood items, items with wood joins
- plant specimens that are not completely dried
- computer media (tapes, discs, optical)
- magnetic media (reel to reel, cassettes, VHS, Beta)
- audio grooved media (cylinders, discs)
- cased photographs (daguerreotypes, ambrotypes, tintypes)
- glass photographs, e.g. glass plate negatives, glass color transparencies (autochromes), lantern slides, mounted glass slides
- metal objects
- objects in poor condition