

MOLD-IT



Learn about mold-making techniques.
Have fun creating lasting impressions.
Make a mold of almost anything and
make casts from the mold.



MOLDING & CASTING

MOLD-IT™

Read directions thoroughly before starting.

Mold-It is a fascinating, educational, and creative introduction to the mold-making process. Learn how and why paleontologists and archaeologists use mold making to duplicate precious, rare fossils and artifacts. Learn about the different kinds of molds and molding materials. With this kit, make a *Seamless Mold* of a favorite item you own. Once the mold is made, make several permanent casts from the reusable mold. Give the casts to your friends and family as gifts.

MATERIALS PROVIDED

- Information about various types of molds. Instructions on how to make a seamless mold.
- Molding material (Make-a-Mold) to make a mold of an object.
- Casting material (PerfectCast) to cast the object that was molded. To cast additional pieces, PerfectCast is available from your local retailer.
- If your kit comes with paints and paint brush, they will be pictured on the back of the Mold-It box.

MATERIALS NEEDED

- Container to mix the Make-a-Mold material.
- Container to form the mold.
- Disposable container to mix PerfectCast. A can or paper cup will work nicely.
- City or distilled water for Mold-It. **Do not use well water.**

INSTRUCTIONS

Find an area with a flat, level, stable working surface, such as a counter-top, desktop or table. Make sure the surface is waterproof; some excess water may spill out of your container. Use a disposable container to mix the PerfectCast and water.

WARNING: Don't place hand in casting material while it is hardening. Don't pour excess material into drain or toilet bowl. Dispose of excess material in garbage.

Adult supervision suggested

MAKING A MOLD

1. Find a waterproof container in which to make the mold. It is important that the size of the container is large enough to hold the object being molded and small enough to insure that there is enough material to cover the object.
2. To test the container for proper size, fill it with 4 cups of water. Then place the object to be molded in the container. The portion of the object to be molded should be completely covered with water with approximately $\frac{1}{4}$ or more inches of space between the object and the walls and bottom of the container. If no water spills out of the container, then the container will be adequate for making the mold.
3. Pour 4 cups of water in a bowl (**Do not use well water**), pour all the Make-a-Mold into the water, and mix with your hands until all the lumps are gone, but not more than 2 minutes. Squeeze the large lumps between your fingers.
4. Pour the mixture into the container you have selected. Hold the object to be molded in the Make-a-Mold mixture. *See tips on page 4 for suggestions on how to make a mold that won't tear.* Be sure that the widest part of the item being molded is in the upper portion of the mixture so it can be easily pulled out of the mold.
5. If you are making a mold of an object that has a large flat bottom, the object can be placed on the bottom of the container and the Make-a-Mold mixture poured on top. The advantage of this alternative is that bubbles will rise to the top and will not appear on the surface of the item being molded. The disadvantage is that the mold will have to be removed from the container for it to be used. If you select this method, make sure that the object being molded is heavier than the mixture and doesn't float.
6. Let it set for at least 5 to 10 minutes, until the mixture is rubbery.
7. When the mixture has completely set, carefully remove the object from the mold. Wiggle the object gently to break the bond between the object and the molding material to prevent tearing the mold. The container around the mold helps to retain the shape of the mold.

MAKING A CAST

1. Place the mold on a flat, stable surface.
2. Mix the PerfectCast in a disposable container, using a ratio (by volume) of 1 part cold water to 3 parts PerfectCast. *See tips on page 4 for estimating the amount of PerfectCast to mix for your cast.*
3. Stir the PerfectCast/water mixture with a spoon or mixing stick until it is evenly mixed (about $1\frac{1}{2}$ minutes). Tap the cup on the table several times to remove air bubbles. There should be no lumps.

4. Pour the PerfectCast mixture into the mold. Rock the container back and forth to remove the remaining bubbles.
WARNING: Do not pour excess material into the drain or toilet bowl. Dispose of excess materials in the garbage.
5. Let PerfectCast set for 30 to 40 minutes. If the object is delicate, allow at least an hour before demolding.
6. After the mixture hardens, carefully remove the cast from the mold. This mold can be reused to make additional casts.

Tip: How to make molds that won't tear.

A mold in which the top (opening of the mold) is smaller than other parts of the mold will probably result in a mold that tears. If you are molding a hand, the wrist is smaller than the hand. Therefore, when molding the hand, keep part of the back of the hand out of the mixture in order to make a larger opening. Keep the fingers relatively straight.

Another method would be to remove the mold from its container and make a cut from the top of the mold to an area which is the largest part of the object. Be sure to put the mold back in the container before casting or the PerfectCast will leak. After the PerfectCast sets, remove the mold from the container before removing the casting.

When removing the mold from the container or removing the object or casting from the mold, gently break the seal between the molding material and the object or container by gently pushing on the mold. Wiggle the mold or object gently to remove. If the mold is in a deep container, it may be necessary to slide a thin object down the inside of the container to break the seal.

Tip: How to measure the volume of the object to be cast.

There is enough PerfectCast to make approximately 1 cup of casting material. If your object has a volume of less than 1/2 cup there is enough material to make 2 casts. If the volume of the object is less than 1/4 cup there is enough material to make 4 casts. To determine the volume of the item to be cast, follow these instructions:

1. Find a container large enough to cover the object with water.
2. Fill the container with water until overflowing.
3. Place the container of water in a larger container.
4. Place the object in the water, allowing the water in the smaller container to overflow into the larger container.
5. Pour overflow into a measuring cup to find the volume of the object.

Tip: Mixing guide for PerfectCast.

Object (volume)	Water (volume)	PerfectCast (weight)
1/4 cup	1 oz	2 3/4 oz (1/4 of bag)
1/2 cup	2 oz	5 1/2 oz (1/2 of bag)
1 cup	3 1/2 oz	11 oz (whole bag)

Mold Making

WHO MAKES MOLDS AND WHY

Natural history museums, educational institutions, and others who search for real fossils have good reason to duplicate their finds. Many fossil finds are rare and in some cases represent one-of-a-kind fossils. In other cases, they may represent the best or most complete specimens in the world. Many fossils are fragile and can't be shipped around the world without risk of damage. The only way to allow study by paleontologists around the world is to provide them with exact copies of original fossils along with copies of journals and photographs of excavation sites.

Experienced mold makers have developed techniques that enable them to make molds of fragile fossils without fear of damage. Casts can then be made from the molds and finished to look exactly like the originals. In fact, paleontologists can take partially complete fossils and, with other fossil fragments, sculpt what the original would have looked like by "filling in the blanks." The sale of these fossil replicas helps finance searches for more fossils as well as providing other paleontologists an inexpensive source of fossil material for study. Many museums use these copies of real fossils in their displays to the public.

INTRODUCTION

There are three popular materials used to make molds: silicone, latex, and material like Make-a-Mold which is included in this kit. The novice mold maker should learn the basics of mold making using kits like the Eyewitness Mold-It Kit or making latex molds as taught in the book *Mold Making* by Skullduggery.

The Eyewitness kit contains Make-a-Mold, a powder that, when mixed with water, hardens within a few minutes. This type of mold material is generally used by dentists. It is not used professionally for making molds of items from which many casts will be made. It is perfect for a kit like Mold-It because it is easy to use, requires little time to make a mold, is easy to clean up and is non toxic. Another advantage of this material is that it is flexible, even an original with small undercuts (any cavity or depression that may hinder the removal of an original from the mold) can be demolded (removing cast from mold) without damage to the

mold or cast.

The mold made from Make-a-Mold is excellent for beginners. However, this molding material disintegrates quickly. To make a mold that lasts, it is necessary to work with other molding materials used to make more permanent molds.

Latex and silicone are two popular materials. They are strong and pick up exceptional detail. Latex rubber is a fast-drying water-based product that cleans up quickly and easily. It is a nontoxic, one-part system that requires no measuring and no mixing. Just brush latex on a well-prepared original, and soon you will have a long-lasting, professional mold. Latex may be used on originals made of metal, clay, plaster, wood, plastic or glass; no special treatment is necessary for most surfaces.

Silicone is a two-part mold-making material that can be used to produce a mold in 24 hours. Silicone is most often used on high-volume production molds but is not necessary for most applications. In order to use silicone properly, a gas extractor system is required. Without gas extraction, air bubbles will remain in the mixture and will appear on the underside of the item being molded. When casts are made from molds that have not been gas extracted, small half-spheres will appear on the surface of the castings where the bubbles settled in the mold.

Many of the techniques used in making latex molds are also used in making silicone molds.

There are two basic mold designs. The simplest and easiest of the two is the Seamless Mold (SM). This particular mold is appropriate if your original has no undercuts and has a wide, flat base that gets narrower the closer you get to the top (a cone-shape). Although there is a side of the item that is not covered by molding material (generally the base), there are no seams in the mold.

The second type of mold is the Seam Line Mold (SLM). This type of mold is appropriate for more intricate originals. It allows for undercuts and other obstacles inherent in more complicated originals. It also allows molds to be made that encompass all sides of the original. These molds will have seams wherever there is a protrusion that can't be pulled out of a seamless mold or whenever a mold is made of all surfaces of an item (no base).

An SLM cannot be made with the Make-a-Mold material. This kit is designed to teach you about different types of molding

materials and different types of molds. Make-a-Mold material is appropriate for one-piece SM molds only.

SEAMLESS MOLDS (SM)

Preparing an original for a latex seamless mold

The preparation of the original item to be molded is one of the most important aspects of mold making. Any flaw or imperfection in the original will show up in the mold and will then be evident in each cast that is poured. A well-prepared original will greatly increase the chance of building a quality mold.

If the original is hollow or has deep detailed crevices, it is important to plug them up. If these holes are left open, the first layers of the mold might get caught in the original. This could cause tears or deformities when demolding the original. It is not necessary to fill in the crevices entirely, but severe indentations should be made shallow enough to allow easy demolding. Modeling clay is ideal for this application. After plugging holes and flaws, use a sculpting tool and small brush to detail the surface of the clay to resemble the texture of the original. The clay will protect the original, extend the life of the mold, and ensure the integrity of any future casts.

It is important not to leave any fingerprints or scratches in the clay or they will be evident in casts.

Applying latex to an original

The item to be molded is placed on a flat, smooth surface. After painting the entire surface of the original with latex, also paint a 1" to 2" overlap of latex on the platform on which the original is resting. The overlap, called a flange or collar, will add strength and stability to the mold.

To add more strength to a mold, layers of gauze are applied between the sixth and seventh latex layers.

Generally small molds require 8 to 9 layers. Larger molds may need up to 12 or 14 layers. The number of layers applied also depends on the fragility of your original. The fewer the layers, the easier it is to demold the original. Unfortunately, this shortens the life of the mold. If the original is extremely fragile, it is generally



recommended that a very thin mold (4 or 5 layers) be constructed, and then a second mold of a cast be made.

SEAM LINE MOLDS (SLM)

Why use an SLM?

If an original has important detail on every surface, an SLM is imperative. Unlike an original that is appropriate for the SM, an original that does not contain a flat bottom base necessitates an SLM. An SLM must completely envelop the original in order to record every bit of detail. There are four processes that must be mastered in order to make an SLM. Most SLMs contain a seam line, a collar, a sprue, and air releases.

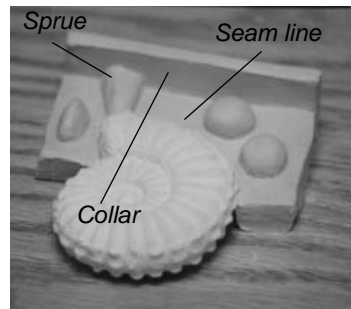


Because the original will be completely engulfed in latex, a seam line must be constructed. This will allow the mold to be opened up during the demolding process. Constructing a seam line is one of the more difficult processes in making an SLM, but it allows you to make a mold of a much more complex original. Once construction of seam lines is mastered there will be almost no limit to the complex originals that can be made into molds. In the end, a seam line will be needed for every undercut or extremity that would otherwise prohibit removal of the original from the mold.

A collar is an external extension of a seam line. It is a feature that helps to keep the mold closed tightly to prevent leaking. A collar must be made for every seam line.

A finished mold must have a sprue, an opening through which the casting material can be poured into the mold. A mold maker must choose the least detailed area at the highest point on the original to construct the sprue.

In the event that the original contains high points that will not receive casting medium because of trapped air, it will be necessary to construct an "air release." This feature allows any air, which may eventually produce an air bubble, to escape.



Preparing the original for an SLM

With an SLM, one side of the mold is constructed and then it is flipped over to construct the other side.

When choosing the proper position for the sprue (pour hole), locate a high point with very little detail. The sprue will normally be a one-inch to two-inch cone-shaped tube that is attached to the original and extends to the outside of the mold. The small end of the sprue will be attached directly to the original. The sprue is generally constructed out of clay. This allows the mold maker to easily manipulate the size and shape of the sprue. The sprue is also generally located along a seam line. If the sprue is not the highest point on the mold, it will be necessary to use air releases on all points higher than the sprue.

The seam line should run along the outermost edge of the original. The seam should be long enough that, when separated, the original can be removed without exerting unnecessary stress upon the mold or the cast. Because the mold will be made of latex rubber it will stretch, but excessive elongation will shorten its life. The less pressure put on a mold, the less the mold will distort and the longer it will last.

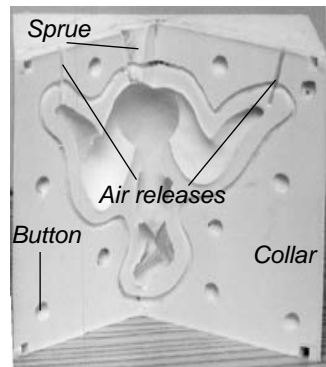
Applying clay to the original; making a collar

Collars are generally made of clay, although other materials such as sheet metal, plastic, etc., can be used as long as they are sealed to the original.

A two-inch wide clay collar is applied to the seamline. The collar should have an airtight seal to the original. The angle of the collar is 90 degrees to the original.

Once the original is fitted with its clay collar, the sprue is attached. The sprue should be constructed of clay and shaped into a cone with a flat small end. The cone is then cut in half, from the top to the bottom, so there are two identical cone halves. The flat side of one of the half sprues is attached directly onto the collar. The other half of the sprue is set aside until the mold is flipped over,

and then it is attached to the first sprue half. The wide end of the sprue should line up perfectly with the outermost edge of the collar, and the narrow end is connected and sealed to the point on the original which will be the entry point for



casting material.

If the original contains a point(s) higher than the area on which the sprue is attached, an air release(s) will have to be inserted along the collar to allow trapped air to escape. The air release is merely a thin cylinder of clay secured to the original and extending out through the collar. NOTE: The seam line must extend to each high point so that the collar provides a surface on which to construct air releases.

Registration clay buttons are attached to the collar. These clay buttons work much like the buttons on a shirt. They help to secure a seam line from slippage and prevent distortion of casts. Buttons are spheres of clay cut in half and attached every ½ to 1 inch or so around the collar.

When the first side of the SLM has an ample number of coats and is completely dry, it can be flipped over and the second half painted.

Applying latex to the second side of your original

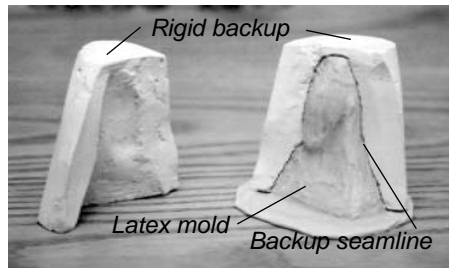
The latex applied to the temporary clay collar has now formed a permanent latex collar. The clay is removed from the collar, and clay buttons are extracted from the collar by pressing on the outside of the latex. The air releases and the sprue are not removed at this time. These pieces **MUST** stay in the collar for the second side in order to create the appropriate passages. The 2nd half of the sprue is now attached to the original half sprue which is still engulfed in latex. This should create a whole cone.

Vaseline or some other mold release is then spread onto the entire latex collar including the inside of the buttons. Without sufficient mold release the second half of the collar will adhere to the first, and it will not be able to be separated without damaging the mold.

When painting the second side of the mold, the latex must be painted over at least 1" of latex from the first side so both halves will become one piece.

BACKUP MOLD

The backup mold works as a protective, custom shell that holds the soft latex mold in the proper position for casting. Without a backup the



latex mold will not hold its proper shape. When it is complete, the different pieces of the backup will fit together like pieces of a puzzle. The number of pieces necessary to complete the backup will be determined by the size and shape of the latex mold.

A popular medium for making a backup mold is HydroCal; a fast-drying putty-like gypsum cement. This type of backup is held together with rubber bands. Other popular types of backups are made from fiberglass or various types of plastic and are either bolted or banded together.

A simple SM requires only a two-piece backup mold; a more complex mold will require more pieces for the backup.

For a more in-depth discussion of mold making, see the pamphlet *Mold Making* by Skullduggery.

COLOR MIXING GUIDE

Kits come with different sets of colors depending on the title of the kit. Mixing instructions may include colors not included in your kit.

Acrylic paints can be thinned with water if they get too thick. Be sure to clean brushes with soap and water before the paint hardens or the paint will become permanent.

Primary colors can be mixed to obtain many other colors. Mix a small amount of two or more colors on a non-absorbent surface.

Always begin with more of the lighter color and a small amount of the darker color. To darken or lighten colors, add small amounts of black, brown or white and mix. Take your time and allow the paint to mix thoroughly before adding more paint.

- White skin - add small amounts of red and yellow to white
- Black/brown skin - add small amounts of white, yellow, red & black
- Army green - mix blue and yellow and a small amount of black
- Ammonite green - mix blue and yellow and a small amount of white
- Carmel - mix small amounts of brown and yellow to white
- Tan or beige - add small amounts of red, brown and yellow to white
- Brown - mix black, yellow, red and green
- Orange - add small amounts of red with yellow
- Gray - mix small amounts of black with white
- Pink - mix small amounts of red with white
- Purple - mix red and blue
- Gold - mix small amounts of yellow with silver
- The pot labeled GL is glue
- Some kits come with a pot labeled ST. This is stain that can be used to antique your creation after painting. Paint on and wipe off.

BIBLIOGRAPHY

Skullduggery, Inc. (1994), *Mold Making*, Skullduggery, Inc., USA

Download other Kit brochures at: <http://skullduggery.com>

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