

# STEPS TO PREPARE MILK REPLACER FORMULA FOR WILD MAMMALS

Recent research on the milk powders, formula recipes and more effective preparation methods have identified ways to improve nutritional benefits of formula fed to young wild mammals.

**READ ALL INSTRUCTIONS FIRST.** *Shortcuts/omissions can compromise results.*

## Step 1: INITIAL PREPARATIONS

**General Note:** *If milk powders are stored in the freezer, remove enough for the next several days and allow to rest in the refrigerator to fully thaw prior to weighing and mixing.*

- 1) Wash hands. Declutter and clean the mixing area. Make sure all tools/utensils are clean.
- 2) Assemble and organize all mixing tools/supplies on the counter that will be needed to prepare the formula (e.g., gram scale; measuring cups; mixing bowls/containers; hand sifter or strainer; whisk, fork, and/or tablespoon; instant read thermometer; marking tape and pen for labeling containers). Include printed copy of the recipe with ingredient weights (don't rely on memory).

## Step 2: WEIGHING

- 1) Remove dry ingredient(s) from refrigerator. Always sniff powders for freshness or an off odor (i.e., rancidity, unexpected scents). Inspect for off-color, contaminants, etc. Discard if concerned.
- 2) Use the scale TARE feature for each measuring container to 'zero' it out before weighing each ingredient separately for the amount specified in recipe. Tightly seal and return unneeded dry ingredients to refrigerator.
- 3) For a single powder recipe, weigh the total amount of water needed in a tared mixing container. For multiple powder recipes, split the water in separate mixing containers to the water weights specified in the recipe to later mix with each powder.

## Step 3: PRE-MIX

- 1) Allow each weighed milk powder to come to room temperature in its own measuring container. Use the instant read thermometer to verify  $\approx 70^{\circ}\text{F}$  ( $21^{\circ}\text{C}$ ). Do not rush this step.
- 2) For clumpy, sticky and hard-to-mix powders, use a fork, strainer, or hand sifter to break up all large clumps to a finer, more granular consistency prior to mixing to enhance overall reconstitution.
- 3) Heat water to  $>130^{\circ}\text{F}$  ( $>54^{\circ}\text{C}$ ). Boiling OK but not required. Let cool to appropriate mixing temperature ( $\approx 110\text{-}130^{\circ}\text{F}$  or  $43\text{-}54^{\circ}\text{C}$ ). Check with instant read thermometer before mixing.

## Step 4: MIXING

- 1) **Single milk replacer powder recipe:** Prepare the powder as described in steps 2-6 below. [**Note:** If the recipe calls for multiple powders, prepare each powder separately (steps 2-6; then combine all liquids later (step 7).]
- 2) Pour the weighed warm water into a formula mixing container (clear glass/plastic; wider diameter better than narrow for more powder-to-water surface contact). Sprinkle the weighed milk powder on the warm water. Do not stir or disturb at this point. Set timer for 5 minutes.
- 3) After 5 minutes, the milk powder on the water in the container will start to wet and begin to sink. Hand whisk powder into water until the powder is completely dispersed ( $\approx 5$  minutes). Pour the liquid through a strainer and push any clumps back into the liquid using the back of a tablespoon. Do not use a countertop/immersion blender; electric mixer; or shaker bottle. *(continued on back >>>)*

# STEPS TO PREPARE MILK REPLACER FORMULA FOR WILD MAMMALS - continued

## Step 4: MIXING (continued)

- 4) Once fully mixed, cover container with air-tight lid to prevent evaporation and/or contamination. Label the container (formula recipe, date/time mixed). If making several formulas or dilutions, label each container individually (recipe/strength, date/time mixed).
- 5) When formula is slightly cooled, place in refrigerator ( $\approx 40^{\circ}\text{F}$  or  $4.5^{\circ}\text{C}$ ) to allow a resting time for the powder(s) to completely hydrate and fully reconstitute (8 hours minimum).
- 6) After the reconstitution time, remove formula(s) from the refrigerator. Stir lightly. For most powders, small clumps will have dissipated. At this point, discard any large clumps (still dry powder) that have not reconstituted rather than straining back into formula
- 7) **Blended recipes:** When mixing a recipe that incorporates two or more milk replacers (that were separately reconstituted into liquid form), pour those liquids into a single container. [If adding other liquids, such as extra fats (e.g., heavy whipping cream, MCT oil), weigh those cooled liquids and add them into formula.] Stir all liquids to fully mix (3-5 min.). It is then ready to warm enough for immediate use or return unheated excess to the refrigerator or freezer. Also return and store any extra fat ingredients to the refrigerator, such as heavy whipping cream, MCT oil, etc.

## Step 5: STORAGE

- 1) Dairy scientists advise mixed/prepared milk formula can be properly stored in the refrigerator up to 3 days ( $\approx 72$  hrs after the 8-hour rest period).
- 2) For longer-term storage, divide into small portions (e.g., silicone ice cube trays), label with product/recipe and date and freeze. Transfer individual frozen cubes to airtight container to minimize air exposure. Frozen cubes may be kept similar to time for ice cream (preferably used in less than a month, but possibly up to 2 months). Remove enough individual cubes for use, slowly thaw in refrigerator, warm water bath or at room temperature (not microwave).

## Step 6: FEEDING









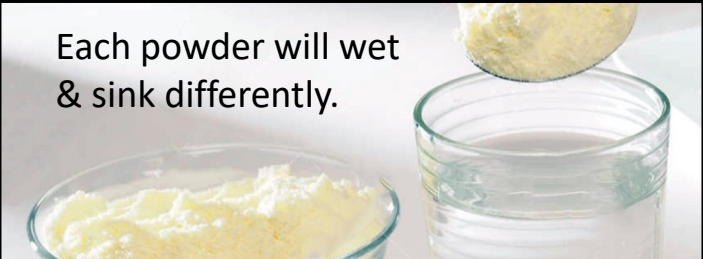
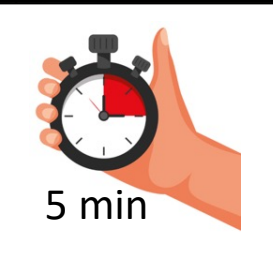

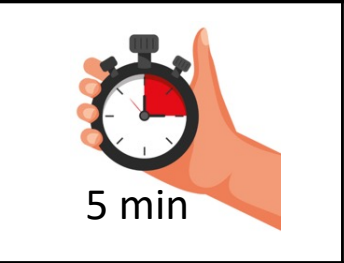

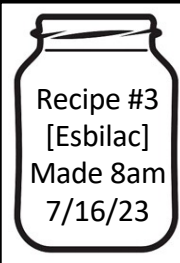
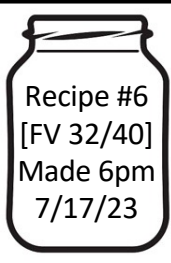
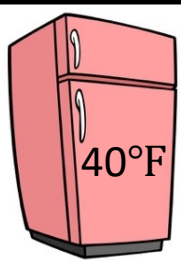
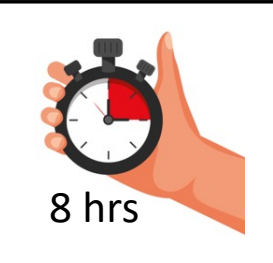



- 1) When ready to feed, lightly and briefly stir the formula liquid again to ensure formula is well mixed with no bubbles.
- 2) Pour only the estimated amount required for this immediate feeding into a container(s) – and warm, such as in warm water bath or bottle warmer. Do not warm formula in microwave.
- 3) Keep the formula containers separate depending on recipe, dilution (e.g., full or half strength formula).
- 4) Follow standard practices to keep the formula containers separate for animals in quarantine.
- 5) Do NOT reuse heated formula; discard leftovers.

Rev. 4/23

*A 'Quick Guide' summary of these steps is available at [ewildagain.org](http://ewildagain.org)*



# 'Quick Guide' - Formula Preparation Steps Using 2 Milk Replacer Powders

<b>Set-up</b>	Clean hands & workspace. Gather tools & recipe.	 Gram scale, mixing containers	 Whisks, timer, thermometer	 Containers for dry measures	List your other tools: <hr/> <hr/> <hr/> <hr/>
<b>Weighing</b>	Remove only amt of powder needed from fridge. Break up clumps. Warm powder to $\approx 70^{\circ}\text{F}$ .	 Weigh each separately	 Use fork, strainer, sifter to disperse.	 $\approx 70^{\circ}\text{F}$	
<b>Water</b>	Weigh specific amount of water for each powder. Heat water to $110\text{-}130^{\circ}\text{F}$ .	 Tare scale to zero	 $110\text{-}130^{\circ}\text{F}$		
<b>Powders</b>	Pour powder on warm water. Wait 5 min. for wetting/sinking.	 Each powder will wet & sink differently.	 5 min		
<b>Whisking</b>	Hand whisk for 5 min. Strain/mash large clumps back into the formula. Cool (room temp).		 5 min	 $\approx 70^{\circ}\text{F}$	
<b>Resting</b>	Label formula containers. Rest in fridge for 8 hours.	 Recipe #3 [Esbilac] Made 8am 7/16/23	 Recipe #6 [FV 32/40] Made 6pm 7/17/23	 $40^{\circ}\text{F}$	 8 hrs
<b>Combining</b>	Combine formulas & other liquid ingredients. Ready to use or store for later.		Storage of combined leftovers ( <i>unheated</i> ).		
		 $40^{\circ}\text{F}$	 $0^{\circ}\text{F}$	Up to 72 hrs (after 8 hr. rest).	Up to 2 mos