Using the Calculator to Develop a Formula Recipe:
Demonstration for Eastern Cottontail

[Video Notes – Copies of charts and tables, plus key notes]
Products and recipes shown are for *illustrative purposes only* to demonstrate use of the Calculator!!

Milk %	Cottontail	Squirrel
Solids	35.7%	26.5%
Protein	14.1%	9.1%
Fat	16.2%	12.4%
Carbs	1.9%	3.2%

Step 1 - Select the species study from the drop-down menu. Select an individual study or the average. The 'Mother's Milk' column provides species milk composition and a good starting point for Step 2 (plus a comparison to Eastern Gray Squirrel milk). First, the Total Solids are 9.2 percentage *points*, or 35% *absolute percent*, higher than the Squirrel milk making it a much richer milk. That's because the solids are made up of proteins that are 55% higher and the fats are 31% higher. The carbs are very low – 40% lower than in the Squirrel milk. That means preference to milk replacers that are high in both protein *and* fat, but at the same time lower in carbs – always a challenge. As before, supplemental fats are likely needed – but Cottontails need more of *different* fats than contained in HWC.

% content	Solids	Protein	Fat	Carbs
FV 32/40 (2022)	93.9	35.9	40.7	8.7
FV 40/25 (2022)	93.4	41.8	24.7	19.0
Esbilac (2022)	94.9	32.9	41.1	15.6
KMR (2022)	93.7	40.8	28.0	18.9
Wombarro Rabbit	93.2	36.7	42.2	9.0
Tailspring Kitten	91.4	44.0	26.8	13.8
MCT oil (C:8+C:10)	100.0	0.0	100.0	0.0
HWC	42.7	2.2	36.8	3.2

Step 2 - Select one or more milk replacer powder products. Use of the TNA (Typical Nutrition Analysis) tab in the Calculator workbook that contains product nutritional composition data from independent lab testing. Since protein and fat are higher, consider selecting milk replacer powders that are high in one or the other, and then combine in a blend to achieve high levels of both protein and fat, if possible. Pay attention to the year of manufacture. Select a milk powder product and year that you have, or simply use the most current listed in the drop-down menu.

Step 3 - Input amounts for one or more products. Try for 70% match of Total solids and major nutritional components. Work to get the solids, proteins, fats, and carbs in the recipe in 65-75% in 'range', ***preferably a balance close to the 70% target.*** Adjustments usually needed in the milk replacer powders, amounts of fats, and amounts of water. During this back-and-forth process, smaller adjustments are better for fine-tuning a recipe.

Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)
68%	70%	75%	72%
67%	69%	67%	68%
67%	68%	81%	75%
124% HIGH	128% HIGH	125% HIGH	126% HIGH
SEE NOTE BELOW	SEE NOTE BELOW	SEE NOTE BELOW	SEE NOTE BELOW
69%	70%	79%	75%
Blend products	**Reduce water**	**Add MCT oil**	**Adjust MCT oil**
1 pt FV 32/40*	1 pt FV 32/40	1 pt FV 32/40	1 pt FV 32/40
1 pt Womb Rab	1 pt Womb Rab	1 pt Womb Rab	1 pt Womb Rab
3 pts water	2.9 pts water	2.9 pts water	2.9 pts water
		0.1 pts MCT oil	0.05 pts MCT oil
Balanced, water needs adjustment	Better, but fats are low	Fats too high	Acceptable – MCT and components

* FV 32/40 (2022)
pt = part

The recap of adjustments for the first example in the video at right shows the progression of steps used in the video to create a recipe using FV 32/40, Esbilac, Wombaroo Rabbit, water and MCT oil. It provides the thinking or rationale for each next step. It also demonstrates the impact that very small adjustments can make on constructing a final recipe.

Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)	Your Recipe as a % of Mother's Milk (see note below)
64%	69%	70%	68%	73%	72%
70%	69%	68%	63%	68%	68%
51%	64%	68%	69%	75%	71%
151% HIGH	148% HIGH	147% HIGH	128% HIGH	139% HIGH	139% HIGH
SEE NOTE BELOW	SEE NOTE BELOW	SEE NOTE BELOW	SEE NOTE BELOW	SEE NOTE BELOW	SEE NOTE BELOW
60%	68%	70%	69%	75%	73%
Blend products	**Add MCT oil**	**Adjust MCT oil**	**Adjust products**	**Reduce water**	**Reduce MCT oil**
1 pt FV 32/40*	1 pt FV 32/40	1 pt FV 32/40	1.3 pt FV 32/40	1.3 pt FV 32/40	1.3 pt FV 32/40
1 pt TS Kitten*	1 pt TS Kitten	1 pt TS Kitten	0.6 pt TS Kitten	0.6 pt TS Kitten	0.6 pt TS Kitten
3 pts water	3 pts water	3 pts water	3 pts water	2.7 pts water	2.7 pts water
	0.1 pts MCT oil	0.125 pts MCT oil	0.125 pts MCT oil	0.125 pts MCT oil	0.1 pts MCT oil

The second example recap shows using FV 32/40 and Tailspring Kitten to arrive at a recipe for the same species. It goes a few extra steps to fine tune the MCT fatty acids and the Calcium and Phosphorus levels.

Note on MCT oil. Remember, a very small amount goes a long way. How much to use? Review the second example in the video as it provides a rule of thumb indicator using the Measurement Guide. It discusses a reasonable range of MCT oil to add depending on if the recipe contains Wombaroo Rabbit or not.

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Using the Calculator to Develop a Formula Recipe:
Practice Set: Suggested Checklist of Steps

1.) Step 1 - Select the species study from the drop-down menu. Select an individual species study or select the average of several studies.

2.) Step 2 - Select one or more milk replacer powder products. Make use of the TNA (Typical Nutrition Analysis) tab in the Calculator workbook that contains product nutritional composition data from independent lab testing. If the species milk composition is high in fat, start with those. If the milk is high in protein, start with those. Pay attention to the year of manufacture. Select a milk powder product and year that you have, or use the most current listed in the drop-down menu.

3.) Step 3 - Input amounts for one or more products. Try for 70% match of solids and major nutritional components.
- Fine tune and adjust in Step 3.
- Adjust the blend between a couple of products. Change the mix of products if needed.
- Add fat (e.g., HWC).
- Add/subtract water to adjust the Total solids close to 70%.
- Focus on the Total solids, protein and fat. These should all be within 1-3 % points of each other.
- Give less priority to carbs if all others look like a match.
- Start by inputting parts. Use decimal points as fractions of parts are usually required.
- Also consider input in weights rather than parts. Use only one method in Step 3 – not both.
- The Measurement Guide will convert the parts (and fractions of parts) to gram weights.

4.) Rewatch portions of the video. Pause the video at any point. Take notes. As you watch, replicate the steps in your downloaded copy of the Calculator.

5.) This takes time and practice. Fine tune as you work through a recipe. Make small adjustments. A final recipe is unlikely to happen instantly with the first attempts. Be patient!

Related resources on ewildagain.org:

*Check out the **'Formula and Feeding'** section for much more on **Proteins; Fats; and Carbs** and their vital roles in nutrition and health.*

*In-depth lab analysis and **milk replacer reviews** for a dozen commonly used products are also included in this section. This includes TNA data; fatty acid profiles; rancidity tests; and reconstitution performance.*

*Visit the **'Quick Reads'** section for more on **Lot Numbers [how to read]** and **Reading/Decoding Product Labels.** Often cryptic and confusing, disclosures on the product packaging can tell us important info.*