Constructing a Nutritious Diet Plan for my Kittens

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Introduction:

In the initial period of rapid growth, kittens will put on weight steadily, gaining about 15 grams or ½ oz. a day. This means that their nutritional needs are constantly increasing. However, to avoid food addiction of one kind of food, variety or combination needs to be included in their diet. For this example, I have chosen KMR (kitten milk replacer), Gerber baby food (beef flavor), and Science Diet kitten hard food as my combination for daily food. I want to find a combination of the three where the total consumption will meet the daily nutritional requirements for my kitten's diet.

Method:

A way to keep track of how much a kitten needs daily is to organize the components and the types of food into a rectangular array, a matrix. By using this linear algebra essential, we can "easily" compute the amount of each nutrition component that is needed daily for the fast-growing kitten. First, let's introduce our kittens that we will be observing for this diet plan.

Meet Sunny and Cher!

For water, 50-70 ml per kg of a cat's body weight is required. Since the density of water is 1 gram per 1 ml, we know Sunny needs 50-70 grams of water for every 1000 grams that he weighs. Well if Sunny only weighs about 340 grams, then he only needs at maximum 23.8 grams of water. For carbohydrates, 30% of the kittens diet is required. For protein, it's 40% and for fats it's 25%.

Nutrient	KMR	Baby	Dry	Sunny's Daily Needs
Protein	2.25	3.38	11.1	10.21
Fat	1.35	1.5	6.3	6.38
Water	24.6	22.5	2.7	23.8

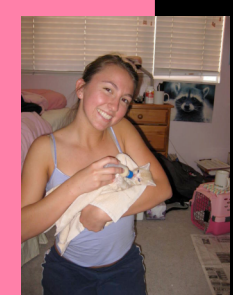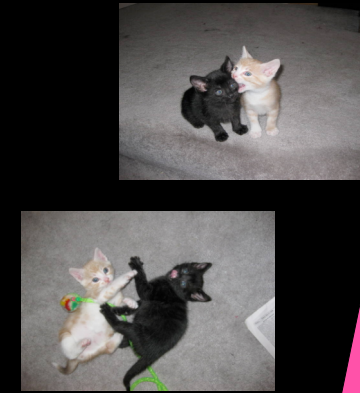| ~…~	1	0	0	1.885
	0	1	0	-1.075
	0	0	1	0.871

Research and Experiment:

Let's take a look at Sunny's weight. Currently, he weighs 12 ox or about 340.2 grams (Note: 1 oz. = 28.35 grams). The 6 basic nutritional components Sunny and all other cats will need are protein, fat, carbohydrates, minerals, vitamins, and water.

Vitamins and minerals are important, however only a small amount of less than 5% is needed. The matrix I have created includes the three food types I want to feed Sunny plus three of the six components which are water, fat, and protein (carbohydrates are counted for in the fat).

Nutrient	Baby	Dry	Sunny's Daily Needs
Protein	3.38	11.1	10.21
Water	22.5	2.7	23.8

~…~	1	0	0.983
	0	1	0.620

Results:

In the matrix with all three food types, a negative number is revealed when the matrix is augmented. Actually there were many trials where a negative number showed up. When excluding KMR, any of the two combinations of the nutrition components resulted in positive numbers. It seems a negative scalar appears in order to make the combination equal to the daily required amount (not under and not over).

Conclusion:

These results mean that combinations of the three foods EXCEED the daily requirement of each of the nutrition components. My failed attempt to show a nonnegative answer proved to me that is really difficult to even create this type of equation realistically. This does not mean that by feeding them all three of the food types, my kittens are lacking the proper nutrients; it actually revealed to me that I may be overfeeding my kittens. Each of the food is so high in nutrients that it would, in fact, be difficult to not exceed the daily requirements of one or more nutrient when fed all three food types.