

# NEW YORK STATE 4-H DAIRY GOAT PROJECT FACT SHEET #15

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## USING MATH TO SEE HOW WELL YOUR GOAT IS GROWING

Math can really help you figure out how well your herd is doing and what management changes you need to make. One of the important uses of dairy goat math is for evaluating the growth of your kids. How well is your kid growing compared to other kids and other herds in NY? You can weigh her and record her weight in your records and then do the proper math to see how she is doing.

For the first three months of age, most healthy goat kids in NY herds grow from 1/3 lb. to 1/2 lb. per day. Kids from the smaller breeds will tend to grow more slowly than kids from the big breeds. Kids from triplet litters will tend to grow more slowly than kids that are singles. Bucks will tend to grow more rapidly than does. There are many reasons why a kid may grow very slowly. Some common reasons are, the kid may 1) have an internal parasite problem like worms or coccidia, 2) not be getting enough milk from their dams or bottles, 3) be on a poor quality milk replacer, or 4) have some sort of disease problem. We usually feed bottle kids about 1 to 2 quarts of milk per day (less the first few days of their lives) and offer them a creep feed that is high in crude protein (14 to 18%) and energy, as well as some alfalfa or grass/legume mix hay. Kids that are on the lower amount of milk will usually investigate their other feeds sooner and eat more of them. Because of this, their rumens may develop earlier. However, if you have plenty of goat milk, it often makes the most sense to feed 1 1/2 to 2 quarts of milk daily. Otherwise, you will need to spend a substantial amount of money on a good quality creep feed. Plan on weaning your kid from milk by 10 weeks to 3 months of age. Your kid should weigh at least 30 lbs then and be readily eating hay and grain.

How fast is my kid growing? First, weigh her. You can either use a hanging scale or you can weigh yourself on your bathroom scale and then stand on it again holding her and calculate the difference. For example, you weigh 70 lbs. but with her you weigh 82 lbs, ( $82 - 70 = 12$ ) so she weighs 12 lb. You can also use a goat weight tape to estimate her weight but these tapes are not as accurate as scales.

Let's say you have two measurements written on the kid's record sheet:

birth	date 4/15/1999	weight 7.5 lb
one month	date 5/15/99	weight 23.5 lb

Figure out how many days there were between the weighings so that you can express growth rate as daily weight gain. For this kid,

April ( $30 - 15$ ) = 15 days

May = 15 days so the total number of days is 30 days

How much weight did the kid gain in 30 days?  $23.5 - 7.5 = 16$  lbs

So daily weight gain was  $16 \text{ lbs} / 30 \text{ days} = .533 \text{ lbs per day}$  or  $\sim 1/2 \text{ lb per day}$ . NICE GROWTH!

You can do this for any time period. If you check on growth each month, you will find that the rate of growth slows as the kid gets more mature.

How much milk did your kid need to drink to produce 1 lb of weight gain ? note - a quart weighs a little more than 2 lbs.

Let's say you fed this kid about 1 lb of milk (really colostrums!) the first 3 days of its life, 2 lbs of milk from 4 to 9 days of age, 3 lbs from 10 to 14 days of age, and 4 lbs from then on until May 15th.  $(1 \text{ lb} \times 3) + (2 \text{ lb} \times 6) + (3 \text{ lb} \times 5) + (4 \text{ lb} \times 16) = 3 + 12 + 15 + 64 = 94 \text{ lbs}$ . In other words she drank 94 lbs of milk in 30 days, or a little more than 3 lbs daily

Of course, not all her growth came from milk because you probably started to offer her a creep feed and some good quality hay starting at 1 to 2 weeks of age. But let's just look at milk alone.

She drank 94 lbs of milk and grew 16 lbs, so  $94 \text{ divided by } 16 = 5.9 \text{ lb}$ . It took about 6 lbs or almost 3 quarts of milk to produce 1 lb of growth.

How much does your kid grow per lb of milk drunk?

Let's say your kid grew @  $1/2 \text{ lb}$  per day the following month drinking @ 4 lbs (or ~2 quarts) of milk daily:

$1/2 \text{ divided by } 4 = 1/2 \times 1/4 = 1/8 \text{ lb of growth per lb of milk consumed}$ .

There are 16 oz in a lb so she grew around 2 oz for each lb of milk drunk.

How many lbs of milk did she need to drink to grow one lb?

$2 \text{ oz} \times 8 = 16 \text{ oz}$  or 1 lb of growth, and  $.1 \text{ lb of milk} \times 8 = 8 \text{ lbs of milk}$

How many quarts were needed this month to produce 1 lb of growth?

There are ~2 lbs in a quart so  $8 \text{ lb} / 2 = \sim 4 \text{ quarts}$ .

Try these for yourself -

- 1) A kid gained 20 lbs in 60 days. How fast was its daily rate of growth?
- 2) Your kid eats 10 lbs of a 15% crude protein feed in a month. How many lbs of protein did it eat in total that month?
- 3) Which has more protein, 20 lbs of a 15% crude protein feed or 15 lbs of a 20% crude protein feed?

Suggested Activities

- 1) Use your records from your own goat kids to calculate their daily weight gain. How do they compare to each other? How well do you think they are growing?
- 2) Make a graph that shows the weight of your kid per week or per month of age (depending on how often you weigh her). What does his or her growth curve look like? Is it very straight or starting to flatten out?
- 3) Make a graph of her average daily weight gain for the same time period.

Answers:

- 1) daily gain =  $1/3 \text{ lb}$ ,
- 2)  $10 \times .15 = 1.5 \text{ lb of crude protein eaten in a month}$ ,
- 3) they both have 3 lbs of crude protein ( $.15 \times 20 = 3$  and  $.20 \times 15 = 3$ ).